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COMBAT SERVICE SUPPORT ENABLER FUNCTIONAL ASSESSMENT  
(CEFA)

(VOLUME II: INDIVIDUAL (65) MINI-CEFA ASSESSMENTS)



Prepared By:

*Jim Behne*  
JIM BEHNE  
Study Director

CERTIFIED and APPROVED BY:

*Gerald A. Klopp*  
GERALD A. KLOPP  
Director  
TRAC-LEE

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## VOLUME II

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1. Title. Advanced Radiographic System (ARS).

2. Designation. Force XXI (FXXI) CSS Initiative.

a. Description: The ARS is a nondevelopmental item (NDI), 2 person portable, field worthy, filmless radiographic system. It utilizes the X-ray generator from the present MK 32 Mod 0/1 Tool Set. The ARS will obtain, enhance, and record images of the internal structures of improvised explosive devices (IED) and unexploded ordnance (UXO).

b. Characteristics: The ARS consists of an X-ray generator, an electronic imager box, and a control unit with connecting cables. The system is powered by self-contained batteries or locally available power. Images may be displayed, enhanced, or stored in the control unit or transmitted digitally to remote database/expert center for more in-depth analysis. The connecting cables are long enough to remote the control unit outside the immediate hazard area of the item being evaluated.

c. Requirement/Need/Mission: IED's have an almost unlimited number of internal configurations and contain a variety of fusing systems. "First seen" or other Unexploded Ordnance (UXO) may have fusing in an unknown condition that continues to present a threat to be countered. Methods through which ordnance can be evaluated and identified without the accompanying hazards to Explosive Ordnance (EOD) personnel are required to assure the highest level of safety.

d. Milestones: Milestone III is scheduled for 2nd Quarter (QTR) Fiscal year (FY) 98.

3. Doctrine, Training, Leadership, Organization, Materiel, and Soldiers (DTLOMS) Area.

a. Primary: Materiel.

b. Secondary: None.

4. Combat Service Support (CSS) E/I Type (Digitization/Modernization (D, M, Both)). Both.

The current basecase takes X-ray photos and produces Polaroid films. The ARS would take X-ray photo "digitally" (no film). Therefore we can transmit these directly to intelligence agencies both inter and intra theater for analysis.

5. CSS Battlefield Operating System (BOS) Function.

a. Primary: Arm.

b. Secondary: None.



But the ARS will directly support the Combat BOS relating to Mobility and Survivability.

6. FXXI Priority. High.

ARS is High priority within the Combined Arms support Command (CASCOM) (DCD-Ord Dir) and with the US Navy. ARS is a Joint Service (Army, Navy, US Marine Corps (USMC) and US Air Force (USAF)) program. Also, ARS is Forces Command's (FORSCOM) 52<sup>nd</sup> EOD Group's #1 priority.

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. None.

[ARS was not in this Plan.]

8. 31 Jan 97 HQ Training and Doctrine Command (TRADOC) WarFighting Lens Analysis (WFLA) Recommendations to HQDA ODCSOPS. Not Briefed.

9. The 1996 US Army Modernization Plan. Not Reviewed.

[ARS was in CASCOM's input to the 1996 Army Modernization Plan (Logistics Annex). CASCOM's input at that time had rated all of the EOD programs as "Red" due to lack of funds.]

10. Prerequisite(s).

a. FXXI Enablers/Initiatives (E/I). None

b. Other prerequisites. None.

11. Overall risk status of

a. Prerequisite E/Is. Not Applicable (N/A).

b. Other prerequisites. N/A.

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. N/A.

b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? None.

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? None.

16. Supporting analytical studies. Yes.

US Naval EOD Technology Division, Cost and Operational Effectiveness Analysis (COEA) for ARS, approved by the Joint Service EOD Program Board in Oct 94. Page 1, "A need exists to rapidly image the internal components of an explosive loaded or suspect device which is in an unknown configuration or condition. There is a further need for a system that is capable of enhancing the image obtained without requiring the EOD technician to make repeated excursions to the explosive device and for that system to transmit the image to a data base/expert center for further enhancement or analysis."

17. Changes in manpower requirements caused by fielding this given CSS E/I. None.

18. Related changes in CSS efficiency. Increase.

Increased capabilities and X-ray safety. This is based on Developmental Test (DT) & Operational Test (OT) I tests conducted May-Nov 96, and by an independent evaluation performed by the Naval Sea Systems Command, FT Story, VA.

19. Related changes in CSS effectiveness. Increase.

The ARS will give a digital picture of the potential bomb, which is better than what the current system can do.

[Thus, better/quicker diagnosis can be made. This in turn will possibly save the lives of EOD technicians, and clear maneuver corridors quicker which will increase maneuver commander's options.]

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself). None.

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Developed.

Concept is approved and published as doctrine in Field Manual (FM) 9-15.

22. Approved documentation (e.g., Mission Need Statement (MNS), Operational Requirements Document (ORD), Basis Of Issue Plan (BOIP)).

a. MNS. Yes.

There is one approved Joint Service over-arching MNS for all EOD related developments (MNS M043-85-93 for EOD).

b. ORD. Yes.

4 May 95 approved ORD (USN # 397-85-95).

c. BOIP. Yes.

BASIS OF ISSUE/TOTAL REQUIREMENT: The ARS is a product improvement of the Mark 32 Mod 0/1 Tool Set, issued 1 per EOD Response Team.

23. CSS E/I training in TRADOC schools. No.

Not yet, but ARS training will take place it is fielded. However, training on bomb disposal techniques is currently provided at the Federal Bureau of Investigation (FBI) school at Redstone Arsenal using TRADOC instructors.

24. Examined in

a. Task Force (TF) XXI Army Warfighting Experiment (AWE) (Mar 97). No.

b. TRADOC Analysis Center's (TRAC) Div Design Analysis Study. No.

c. The Nov 97 Division AWE (DAWE). No.

25. Tested elsewhere. Yes.

Tested by the US Naval Technology Division, Indian Head, MD. May 96-Nov 96 (DT & OT I); May 97-Nov 97 (DT & OT II). Test results verifying the success of the ARS are on file at CASCOM. Also, ARS will use Civilian-Off-The-Shelf (COTS) technology which has been proven in the civilian sector.

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 Program Objective Memorandum (POM), and (c) Extended Planning Program (EPP) FY 04-12. Yes.

[The CASCOM WFLA Subject Matter Expert provided this study team with information that 196 systems are required for Force package (FP) 1, 35 for FP2, 84 for FP 3, and 78 for FP 4. All systems are budgeted in the POM and EPP.]

27. Planned BOIP (connectivity between FP). Yes.

Plans call for fielding the ARS one per EOD Response Team.

28. Technical capabilities. Proven.

Refer to above test information. Also, ARS will use proven COTS technology.

29. Logistics Integration Agency's (LIA) 15 elements of Integrated Logistics Support (ILS) assessment. Unknown.

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). Yes

[The CASCOM ARS SME responded "N/A. The ARS is a Corp level asset" for

paragraph 30a. However, based on funding information as contained in paragraph 26 above, this study team assumed that the ARS will be fielded in time "to support" the First Digitized Division.]

b. In time for the First Digitized Corps (2006). Yes.

c. During FY 07-10. Yes.

31. Overall Peacetime (Programmatic) risk. Green.

32. Likelihood of CSS E/I performance degradation during wartime due to threat, Reliability, Availability and Maintainability (RAM) failure or lack of requisite force structure. Low.

33. Likelihood of prerequisite Combat (C), Combat Support (CS) or CSS E/I wartime degradation. N/A.

34. Wartime backup (BU) system. The current system employing the use of Polaroid film will be retained even after ARS fielding. Thus, the current method would always be available as a BU system to the ARS.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. N/A.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. Medium.

[SME responded that we would still be able to perform the EOD mission, but EOD technicians would be exposed to unnecessary risk. Also, use of the BU system would decrease the planned capability for EOD to respond to unexploded ordnance items that threaten the maneuver commander's combat power and line of communication.]

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. High. EOD missions include bomb disposal support to the mobilization base, the US land mass, counter-terrorism, and Presidential protection. Fielding only to those units in FP 1 would seriously degrade the remaining unit's ability to provide this support.

38. Other adverse wartime impacts (e.g., scenario dependent). None.

39. Overall wartime risk associated with employment of this CSS E/I. Green.

40. Overall risk (considering both programmatic and wartime risks). Green.

41. Ordinal ranking of this CSS E/I by the CSS DCD.

42. Cardinal ranking of this CSS E/I by the CSS DCD.

43. Comparison of rankings to CASCOM Commander's (CDR) 4 Sep 96 CSS Materiel Master Plan (MMP) priorities. N/A

44. Remarks. None.

45. Data Sources. MSG Frey, CASCOM (DCD-Ordnance (Ord) Directorate (Dir)), DSN: 687-0566) and Mr. Charles Moore, CASCOM (DCD-CSS Dir), DSN: 687- 0093.

1. Title. Air Ambulance (UH-60Q MEDEVAC Helicopter)

2. Designation. FXXI CSS Initiative.

Provides medical units w/on-board medical technology to significantly increase casualty care on an airframe that is more reliable and tactically versatile. Replaces UH-1V helicopters and upgrades UH-60A aircraft w/medical communications and navigation equipment applied as a materiel change. The resulting UH-60Q will equip all divisional and non-divisional air ambulance units.

a. Description:

(1) Of the 65 most significant lessons learned by the Army in Operation Desert Storm, the need to modernize the Army's aeromedical evacuation fleet was number one. The Army's MEDEVAC fleet of obsolete UH1s and UH60As without enhanced medical, communication and navigational capabilities, has not been given the requisite priority that the mission requires. Modernization is critical to ensuring timely evacuation of casualties from the battlefield, improved patient care for the wounded, increased aircraft and crew survivability and overall mission capability.

(2) The UH-60Q is an advanced, medically-equipped version of the UH-60 which integrates advanced technology and state-of-the-art medical, navigation, communication and mission equipment. The UH-60Q is key to the Army's ability to conduct the medical mission on the battlefield of the future. The ability to acquire and evacuate casualties under medical supervision to the point of initial treatment and then out of theater is absolutely essential. The impracticality of providing patient beds in large numbers in the forward areas of a fast moving battlefield makes it imperative that future evacuation platforms be significantly more capable than those in the field today.

(3) The UH-60Q replaces UH-1V helicopters and upgrades UH-60A helicopters by applying a materiel change which optimizes the aircraft for its medical evacuation mission. The materiel change makes significant improvements in the ability to provide on-board care, communicate on future battlefields, and navigate effectively in adverse weather.

b. Characteristics: The UH-60Q is the number one near-term medical modernization issue for the Army and is critical to Early Entry, mounted and dismounted forces. Designed to replace the UH1 and UH-60 airframes in aeromedical evacuation units on a one-for-one basis the UH-60Q will protect and sustain the force through:

- \* Improved medical capabilities (oxygen, suction, electric power for equipment, storage for equipment, combat litter system, and hoist).
- \* Improved navigation capabilities (Global Positioning System, Forward Looking Infrared System, and Tactical Air Navigation).
- \* Improved communication capabilities (data bus, high frequency multiband, provisions for insertion of digital systems for command and control, and telemedicine).

c. Requirement/Need/Mission: This aircraft provides medical evacuation of casualties from as far forward as the tactical situation permits; conducts combat search and rescue; transports

medical materiel and teams on an emergency basis; and performs the shore-to-ship evacuation mission. The General Accounting Office identified the evacuation deficiency in its report to Congress in 1992. The Army Plan states: "Enhance the battlefield medical system by acquiring modern medical evacuation aircraft". Lessons learned from Operations Just Cause and Desert Storm showed a need for medical version of the UH-60. The UH-60Q was a TRADOC FY 96-10 and FY 97-11 "must have" WarFighting Lens Analysis solution in order to decrease risk, improve deployability, supportability and training of the force and ensure survivability of Early Entry/Dismounted Forces. Medical Evacuation was the Surgeon General's number one near-term medical modernization priority in the FY 94-08, FY 95-09, & FY 96-10 Army Modernization Plan. Commander-in-Chief (CINC) requests the replacement of UH-1 MEDEVAC aircraft with UH-60Q. If not funded, aero-MEDEVAC units will continue using obsolete UH-1s & UH-60As without enhanced medical, navigation and communication capabilities. This will result in significant degradation of medical support to units on the extended battlefield. Not funding this requirement ensures the continued erosion of the evacuation fleet and its inability to keep pace with supported combat units.

### 3. DTLOMS Area.

#### a. Primary: Materiel.

The UH-60Q replaces the aging UH-1 and upgrades the UH-60A helicopters by applying a materiel change which optimizes the aircraft to medical evacuation purposes.

#### b. Secondary: Soldiers.

### 4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Both.

The UH-60Q provides improved communications capabilities operating off of a digital data bus for high frequency multiband radios as well as digital Command and Control and Telemedicine systems.

### 5. CSS BOS Function.

#### a. Primary: Man.

#### b. Secondary: None.

### 6. FXXI Priority. High.

Ranked number 1 of 13 approved Medical Future Operational Capabilities in TRADOC Pamphlet 525-66, dated 1 Dec 96.

[This study team could not (a) locate the cited TRADOC Pamphlet 525-66, dated 1 Dec 96. However, TRADOC Pamphlet 525-66, dated 1 May 97, page 105, paragraph 4-17, MD 97-001(a) discusses "Patient Evacuation- Aeromedical Evacuation," and (b) find any reference that the ordering of these paragraphs indicated a "ranking."]

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. None.

[The UH-60Q was not listed in this plan.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Briefed

[HQ TRADOC briefing charts recommend that: "... UH-60 (MEDVAC conversion kits) receive an additional \$13.3M by FY 00 and an additional \$23.1M by FY 03. Buys 134 kits to convert available UH60's into basic MEDEVAC aircraft."]

9. The 1996 US Army Modernization Plan. Reviewed.

[a. As input to the 1997 Army Modernization Plan, in the Fall of 1996 the AMEDDC&S recommended the UH-60Q as their #1 priority in the Combat Health Support Annex.

b. With respect to the 1996 version of the Army Modernization Plan: (1) Page L-7 discusses Patient Evacuation and indicates that: "... Patient Evacuation is the Army's number one medical readiness shortfall and the AMEDD's first priority." This Plan rated this capability as "Red" for the entire FXXI years (FY 98-10) since "... limited resources exist to provide evacuation to the force. ...Aeromedical evacuation units continue to use aging platforms such as UH-1s and other platforms such as UH-60As that lack enhanced medical, navigation, and communications capabilities..." and (2) Page J-11 cites that "...The UH-60A MEDEVAC (assessed "Amber" ) lacks the capability to meet many of its assigned missions: sustainment of casualties over extended distances; shore to ship evacuation; supporting combat search and rescue; and patient regulating. Additionally, the UH-60 MEDEVAC is not capable of functioning on the digitized battlefield or using tele-medicine technology."]

10. Prerequisite(s).

a. FXXI E/Is. CSS  
Telemedicine.

[The Army Medical Department Center and School (AMEDDC&S) SME responded that "Telemedicine appears to be the only E/I related to the UH-60Q." He further wrote, "The UH-60Q provides improved...command and control and telemedicine systems. Lastly, refer to paragraph 9 above. It cites the 1996 Army Modernization Plan, which indicates that the UH-60A MEDEVAC is not capable of functioning on the digitized battlefield or using telemedicine technology.]

b. Other prerequisites. None.

11. Overall risk status of

a. Prerequisite E/Is. Medium.

[The Telemedicine CSS Enabler Functional Assessment (CEFA) assigned an overall risk rating of "Amber" (Medium) due to "No Army-unique ORD has yet been developed. Inadequate



development/fielding funds. Expected lack of adequate wartime backup system. And a possible increase in manpower requirements."]

b. Other prerequisites. N/A.

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. None.

b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? None.

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? Unknown.

16. Supporting analytical studies. Unknown.

UH-60Q MEDVAC Configuration Abbreviated Analysis (AA) approved by the DCSOPS, Oct 94.

[AMEDDC&S SME responded "Yes." This study team requested and received from AMEDDC&S a copy of the Executive Summary for this AA. Note (a) The Executive Summary AA cover letter indicates that it was "reviewed" by the CDR, USAMEDDC&S on 5 Jul 95, but indicates no "approval" date, and (b) on page 2 of the Executive Summary it reads "...Analytical Limitations...Time constraints, resource limitations and other analytical priorities at US Army Aviation Center and School (USAAVNC&S) and AMEDD prevented a more comprehensive analysis of mission requirements and the associated operational benefits to be derived from each item of equipment proposed for the UH-60Q. In fact, these constraints caused the study team to focus its efforts on showing the costs and operational benefits of the MIL-STD-1553 data bus, forward looking infrared (FLIR), and the on-board oxygen generating system (OBOGS). A complete COEA was beyond the capabilities of both the AMEDDC&S and the Aviation Center and School to execute in either a timely manner or without expensive reliance on external contractor support. Cost estimates projected for such an effort by ATCOM are in excess of \$600K, resources USAAVNC does not have, and would take 6-9 months." This study team did not review the full AA and does not know if it sufficiently supports the UH-60Q. Based on the above stated focus of the AA, this study team assigned an Unknown" response.]

17. Changes in manpower requirements caused by fielding this given CSS E/I. None.

The UH-60Q is a one for one replacement - 1 UH-60Q for 1 UH-60A. There will be no new Military Operational Speciality (MOS) created by the fielding of this system. Crew sizes will be the same.

[The SME indicate that there likely would be little if any change in aviation maintenance. However, there would be a yet-to-be-determined added manpower burden for maintaining the new medical equipment planned for the UH-60Q.]

18. Related changes in CSS efficiency. Increase.

The UH-60 is an advanced, medically equipped, version of the UH-60A which integrates advanced technology and state of the art medical, navigational and communication equipment. Enhances the ability to locate patients, provide on-board treatment, communicate with support treatment facilities, and navigate in adverse weather will significantly increase medical capability on an ever expanding battlefield. The UH-60Q will better operate in disaster relief and humanitarian missions by the addition of an improved litter system which greatly facilitates on-board medical care. Each litter's position can be adjusted in flight, each litter station also has suction and aspiration.

19. Related changes in CSS effectiveness. Increase.

This aircraft adds the ability to support maneuver forces at night, in adverse weather, and during limited visibility condition-the very conditions we doctrinally want to support in war.

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself). None.

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Developed.

Approved and contained in FM 8-10-6, Medical Evacuation in a Theater of Operations.

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. Yes.

MNS approved Oct 94 by the Headquarters Department of the Army (HQDA) Deputy Chief of Staff for Operations (DCSOPS).

b. ORD. No.

[No information provided by AMEDDC&S.]

c. BOIP. No.

Not yet. BOIP: TBD. Line Item Number (LIN) Z To-Be-Determined (TBD). Upgrades LIN K32293 used as air ambulance; replaces LIN K31795 UH-1V air ambulance. Total requirements: 357 (FPI - 117; FP II - 90; FP III - 45; FP IV - 105).

23. CSS E/I training in TRADOC schools. No.

No training is currently underway in TRADOC schools. However, qualification training for the UH-60Q begins in Aug 97 at the Sikorsky plant in Connecticut.

24. Examined in

a. TF XXI AWE (Mar 97). No.

b. TRAC's Div Design Analysis Study. No.

c. The Nov 97 DAWE. No.

25. Tested elsewhere. No.

However, plans call for (a) technical testing at Ft Rucker, Jun-Aug 97, and (b) operational testing at Ft Campbell, Oct-Dec 97.

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. No.  
MDEP FPEG SSN TBD. Estimated Unit Cost approximately \$1.6M.

27. Planned BOIP (connectivity between FPs). Yes.  
Plans call for fielding the UH-60Q to all four FPs.

28. Technical capabilities. Unknown.

[SME responded "Proven. The UH-60A is a proven aircraft. The UH-60Q builds upon the capabilities of the UH-60Q. However, this study team was provided no information as to the proven capabilities of the medical equipment planned to be included onboard the new UH-60Q. Also, the SME indicated that Telemedicine is a prerequisite for this initiative (This study team does not know the percentage of the planned medical equipment that Telemedicine encompasses.) However, the Telemedicine CEFA assessment indicated that Telemedicine's capabilities are "unproven." Refer to paragraph 28 of the Telemedicine CEFA assessment for further explanation. Based on the above, this study team assigned an "Unknown."]

29. LIA's 15 elements of ILS assessment. Assessed.

[This study team was able to determine that the Operational Test and Evaluation Command (OPTEC) did conduct an ILS review for the Air Ambulance (UH-60Q). However, limited study time precluded any further attempts to acquire their assessment.]

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). Unknown.

b. In time for the First Digitized Corps (2006). Unknown.

c. During FY 07-10. Unknown.

31. Overall Peacetime (Programmatic) risk. Red.

Complete lack of funds, lack of testing, no approved ORD, uncertain status of technical capabilities, and the programmatic risk issues associated with the Telemedicine prerequisite.

[The Telemedicine CEFA assessment indicates an "Amber" programmatic risk rating due to "No Army-unique ORD has yet been developed; there are inadequate development/fielding funds, and there may be an increase in manpower requirements."]

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.  
The UH-60 is a proven technology.

33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation. Low.

[Refer to the Telemedicine CEFA assessment.]

34. Wartime backup (BU) system. BU systems would be other air/ground ambulances, or other available means of transport. However, they would not have any backup life support capabilities that the UH-60Q is specifically designed to have.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. N/A. Some form of BU system would likely be available; but unless it would be another UH-60Q from a sister unit, it would not possess the new life support capabilities of the UH-60Q itself.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. Medium. It is likely that quick evacuation will always be present on the battlefield. However, in the absence of a UH-60Q aero-MEDEVAC units would have to revert to using obsolete UH-1s & UH-60As without enhanced medical, navigation and communication capabilities. This would result in significant degradation of medical support to units on the extended battlefield.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Medium.

[Plans call for fielding the UH-60Q to all four FPs. However, there would be a severely reduced medical evacuation and treatment capability in those units not receiving the planned UH-60Q.]

38. Other adverse wartime impacts (e.g., scenario dependent). None.

39. Overall wartime risk associated with employment of this CSS E/I. Green.

40. Overall risk (considering both programmatic and wartime risks). Red.  
Complete lack of funds, lack of testing, no approved ORD, uncertain status of technical capabilities, and the programmatic risk issues associated with the Telemedicine prerequisite.

41. Ordinal ranking of this CSS E/I by the CSS DCDs.

42. Cardinal ranking of this CSS E/I by the CSS DCSs.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities. N/A.

[The UH-60Q was not listed in this Plan.]

44. Remarks. The UH-60Q is the number one near term medical modernization issue for the Army Medical Department and is critical to Early Entry mounted and dismounted forces. The UH-60Qs

capabilities and versatility make it the AMEDDs most important tool to meet the MEDEVAC needs on the modern battlefield.

45. Data Sources. MAJ Sadler and MAJ Wesloh, AMEDDC&S, DSN: 471-1334. AMEDDC&S' 13 May 97 draft input to CASCOM's 1997 CSSMMP.

1. Title. Ammunition Solar Cover (ASC).

2. Designation. FXXI CSS Enabler-Offsets Required Capability (ORC).

The ASC offsets the required capability of protecting ammunition from high solar loading.

a. Description: The ASC is a modular solar cover designed to protect ammunition stocks from direct solar radiation in hot environments.

b. Characteristics:

- Type I is 35 foot by 35 foot square
- Type II is 50 foot by 50 foot square
- Provides a 60% solar block
- 14 feet height when fully extended
- Multiple solar covers can be joined together

c. Requirement/Need/Mission: In response to a CINC requirement, Natick Research, Development and Engineering Center developed covers to provide relief from high solar loading experienced by troops in Saudi Arabia. Solar covers are designed to protect ammunition stocks, soldiers, tactical vehicles, maintenance areas, and fixed site supply points. They are constructed from an open weave mesh material (similar to burlap), and allow hot air to pass through its pores. Formal development began in 1993 with the initiation of a Mission Need Statement by the Ordnance Missile and Munitions Center and School. The Combined Arms Support Command and TRADOC Munitions System Manager is the Combat Developer. The National Training Center is the test and evaluation site for solar covers.

Solar covers were used in Somalia and Haiti and have tremendous soldier acceptance. Army units will use ASC in a theater of operations to protect ammunition stocks and operations from high solar loading. Current systems include camouflage covers/tarps that do not adequately maintain required storage temperatures for many ammunition items. Canvas tarps absorb heat and require excessive space for transportation and storage.

d. Milestones: LRIP Contract Award estimated to occur in 2nd quarter FY98.

3. DTLOMS Area.

a. Primary: Materiel.

b. Secondary: None.

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Modernization.

5. CSS BOS Function.

a. Primary: Arm.

b. Secondary: Distribute

6. FXXI Priority. Medium.

Medium within the CASCOM (DCD- Ord Dir).

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. Low.

[ASC was prioritized as # 44 out of 51 items. Also, ASC was prioritized # 15 out of 21 ordnance items.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed.

9. The 1996 US Army Modernization Plan. Reviewed.

[Page I-10 of the Sustain The Force section (CSS Equipment) of this Plan discussed the Ammunition Solar "Shades" It reads "...Soft shelters provide protection from climatic extremes as well as battlefield threats, while minimizing weight and volume...Current programs include the...Ammunition Solar Shades...This program (CSS Equipment) is rated "Amber" for near-, mid-, and far-terms (FY 96-11). Funding shortfalls have delayed the research and development of the...soft shelter programs. Mid- and far-term funding is not sufficient to carry out planned field and food service equipment and soft shelter modernization program."]

10. Prerequisite(s).

a. FXXI E/Is. None.

b. Other prerequisites. None.

11. Overall risk status of

a. Prerequisite E/Is. N/A.

b. Other prerequisites. N/A.

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. N/A.

b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? None.

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? None.

16. Supporting analytical studies. None.

[SME did not know of any supporting studies. SME indicated that none may be required since ASC is an Acquisition Category (ACAT) III system. SME was referring to the May 93 CDR TRADOC message that indicates no large analyses were needed for ACAT III and IV systems, unless specifically directed by HQDA.]

17. Changes in manpower requirements caused by fielding this given CSS E/I. None.

18. Related changes in CSS efficiency. Increase.

ASC will increased explosive safety. Current protective systems include camouflage covers/tarps that do not adequately maintain required storage temperatures for many ammunition items. Canvas tarps absorb heat and require excessive space for transportation and storage.

19. Related changes in CSS effectiveness. Increase.

ASC will protect ammunition stocks from high solar loading.

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself). None.

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Developed.

The ASC operational concept already exists in that the Operational Mode Summary/Mission Profile of the ASC ORD will be used instead.

22. Approved documentation (e.g.: MNS, ORD, BOIP).

a. MNS. N/A.

None required.

b. ORD. Yes.

HQ TRADOC approved the ASC ORD on 9 Apr 97.

c. BOIP. N/A.

ASC will be a CTA item. TOTAL REQUIREMENT: Operation Desert Shield/Storm observations, related data and recent operations, identified the requirement for solar covers. Initial ammunition requirements for Operation Desert Storm/Shield (estimated by HQDA ODCSOPS) were 160,000 short tons. Based on 320,000 short tons for two Major Regional Conflicts (MRC) and 56 short tons per solar cover, the Army requires 5,714 ASC systems. If only one MRC is in a hot climate, the total requirement is 2,857 systems. Plans call for fielding the Type I for General Supplies (35' x 35') at 66 per division. Type II for ammunition (50' x 50') at 100 per division.

23. CSS E/I training in TRADOC schools. No.



If there is to be any future ASC training, it will minimal. ASC fielding will not change our training procedures for ammunition protection.

24. Examined in

- a. TF XXI AWE (Mar 97). No.
- b. TRAC's Div Design Analysis Study. No.
- c. The Nov 97 DAWE. No.

25. Tested elsewhere. Yes.

ASC was tested at the Yuma proving Grounds, AZ., and at Ft Irwin, CA.

[SME did not have any available test results.]

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. Yes.

Funding is only for low rate initial production contract award estimated for 2nd quarter FY 98. Production funding has not been identified beyond FY97. System costs should not exceed \$2,500 each. Procuring agency is the Defense Logistics Activity (DLA).

27. Planned BOIP (connectivity between FPs). N/A.

ASC will be a CTA item. Refer to paragraph 22c above.

28. Technical capabilities. Proven.

ASC technical capabilities (refer to approved ORD) have been proven in aforementioned field trials.

29. LIA's 15 elements of ILS assessment. Assessed.

[This study team was able to determine that OPTEC did conduct an ILS review for the ASC. However, limited study time precluded any further attempts to acquire their assessment.]

30. Fielding schedule.

- a. In time for the First Digitized Div (Sep 2000). No.
- b. In time for the First Digitized Corps (2006). No.
- c. During FY 07-10. No.

31. Overall Peacetime (Programmatic) risk. Amber.

Lack of funds.

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.

33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation. N/A.
34. Wartime backup (BU) system. BU system would be the use of tarps other available coverings.
35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. N/A.
36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. Medium. The adverse impact would be the same as we now experience. Today, we must constantly monitor ammunition stocks and use less efficient means of environmental protection devices against heat and humidity.
37. Adverse wartime impacts due to limited fielding of this given CSS E/I. N/A. ASC will be a CTA item available for purchase by units as required.
38. Other adverse wartime impacts (e.g., scenario dependent). None.
39. Overall wartime risk associated with employment of this CSS E/I. Green.
40. Overall risk (considering both programmatic and wartime risks). Amber  
Due to lack of funds.
41. Ordinal ranking of this CSS E/I by the CSS DCDs.
42. Cardinal ranking of this CSS E/I by the CSS DCDs.
43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities.
44. Remarks. None.
45. Data Sources. CPT (P) Yarberry, CASCOM (DCD-Ord Dir), DSN: 687-0250. CASCOM Sep 96 CSSMMP and related May 97 updates.

1. Title. Armored Medical Evacuation Vehicle (AMEV).

2. Designation. FXXI CSS Initiative.

Provides medical platoons and forward medical companies with an enhanced armored vehicle for evacuation of casualties and the capability to perform en-route emergency medical treatment.

Replaces the M113A2/A3 tracked ambulance.

a. Description: The Armored Medical Evacuation Vehicle (AMEV) replaces (one-for-one) the M113A2/A3 tracked ambulance. This system provides the medical platoons and forward medical companies with an enhanced armored vehicle for evacuation of casualties with the capability to perform en-route emergency medical treatment.

b. Characteristics: The AMEV projects and sustains the force through:

- \* improved survivability from enhanced armor protection;
- \* improved automotive, electrical, communications, interior design, environmental support, chassis compatibility, and machine/soldier interface;
- \* increased operational mobility (allowing mobility equal to supported forces); and
- \* decreased mortality and morbidity due to the addition of on-board medical treatment capability.

c. Requirement/Need/Mission: This medical evacuation system is required to rapidly collect, evacuate, treat, and return combat soldiers to duty. Our armored forces have a need for an armored evacuation vehicle that is capable of keeping up with supported forces and provides close combat medical evacuation and treatment in support of Army operations. The Army Plan indicates a need to acquire enhanced and modern evacuation capabilities. This requirement is identified in the Army Modernization Plan. An armored evacuation vehicle will correct known deficiencies in the current M113A2/A3 armored personnel carrier such as inadequate casualty evacuation and treatment capacity; poor patient and attendant ride stabilization; limited patient in-transit support by aidmen; inadequate space for supplies, equipment, and personnel; and no collective Nuclear, Biological and Chemical (NBC) protection. Furthermore, the M113A3 is not a dedicated ambulance system. The M113A2 has the additional deficiency of not being able to keep up with the units it supports on the battlefield. If not funded, armored units will continue to use armored personnel carriers which are inadequate for its stated mission and hence contribute to higher mortality and morbidity rates.

3. DTLOMS Area.

a. Primary: Materiel.

The AMEV program is linked to the Bradley Command and Control Vehicle (C2V) program because the best suited vehicle type for the mission, in production, is a modified C2V.

b. Secondary: None.

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Both.

The AMEV will have the communications and situational awareness capabilities, compatible with the force it supports, which will be necessary to survive and provide support on the 21st Century battlefield. The AMEV replaces the M113 tacked ambulance with an enhanced armored vehicle for evacuation of casualties with the capability to perform en-route emergency medical treatment.

[This study team was advised by the SME that the AMEV will need FBCB2-CSS Functionality]

5. CSS BOS Function.

a. Primary: Man.

b. Secondary: None.

6. FXXI Priority. High.

Ranked number 1 of 13 approved Medical Future Operational Capabilities in TRADOC Pam 525-66, dated 1 Dec 1996.

[This study team could not (a) locate the cited TRADOC Pamphlet 525-66, dated 1 Dec 96. However, TRADOC Pamphlet 525-66, dated 1 May 97, page 105, paragraph 4-17, MD 97-001(b) discusses "Patient Evacuation- Ground Evacuation." and (b) find any reference that the ordering of these paragraphs indicated a "ranking."]

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. None

[The AMEV was not discussed in this Plan.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed

9. The 1996 US Army Modernization Plan. Reviewed.

[a. As input to the 1997 Army Modernization Plan, in the Fall of 1996 the AMEDDC&S recommended the AMEV as their #1 priority in the Combat Health Support Annex.  
b. With respect to the 1996 version of the Army Modernization Plan: Page L-7 discusses Patient Evacuation and indicates that: "... Patient Evacuation is the Army's number one medical readiness shortfall and the AMEDD's first priority." This Plan rated this capability as "Red" for the entire FXXI years (FY 98-10) since "... limited resources exist to provide evacuation to the force. ...Ground evacuation units continue to use outdated ground ambulances that cannot keep pace with supported ground units and that do not have an on-board medical treatment capability under the protection of armor...."]

10. Prerequisite(s).

a. FXXI E/Is. CSS

FBCB2-CSS Functionality. The AMEV is going to use FBCB2-CSS Functionality for situational awareness.

b. Other prerequisites. None.

11. Overall risk status of

a. Prerequisite E/Is. Medium

[The CEFA assessment for FBCB2-CSS Functionality indicated its overall risk rating to be "Amber."]

b. Other prerequisites. N/A.

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. None.

[FBCB2-CSS Functionality would continue to be developed even if the AMEV program is discontinued.]

b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? None.

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? None.

16. Supporting analytical studies. None.

The Armored Medical Evacuation Vehicle does not have a COEA; although the AMEDDC&S probably shall have this analysis performed in the near future (perhaps finished by mid-Sep 97). The AMEV can not use the COEA of the Armored Medical Treatment Vehicle because the missions of the two vehicle are too diverse.

17. Changes in manpower requirements caused by fielding this given CSS E/I. None.

The AMEV will be a one-for-one replacement for the M113 ground ambulance with its current crew size of 3 personnel.

[SME gave no indication if the AMEV will impose a greater/lessor burden on the FXXI maintenance and supply systems than the current M113 ambulance.]

18. Related changes in CSS efficiency. Increase.

A non-official email report of the CSS portion of the OPTEC test report on the AMEV at the National Training Center (NTC) rotation in support of Task Force XXI indicates that the AMEV performed well. The final OPTEC test report is scheduled to be released on 1 July 1997.

[SME indicated that the AMEV would be superior to the M113 armored ambulance in all areas. Most notable are advanced patient treatment capabilities; increased survivability due to armor

protection; increased mobility; NBC overpressure, environmental control; and situational awareness.]

19. Related changes in CSS effectiveness. Increase

The AMEV will meet or exceed all requirements outlined in the TRADOC approved ORD. Emerging results from the NTC rotation in support of Task Force XXI indicate that the AMEV performed well. The final OPTEC test report is scheduled to be released on 1 July 1997. The AMEV projects and sustains the force through:

- \* improved survivability from enhanced armor protection;
- \* improved automotive, electrical, communications, interior design, environmental support, chassis compatibility, and machine/soldier interface;
- \* increased operational mobility (allowing mobility equal to supported forces); and
- \* decreased mortality and morbidity due to the addition of on-board medical treatment capability.

[ORD requirements were not provided this study team.]

20. Related force structure (equipment and/or organizational) changes.

- a. In equipment (other than the equipment associated with the given CSS E/I itself). None.

[This study team does not know the extent to which the required FBCB2-CSS Functionality devices are/are not designed and/or funded as integral components of the AMEV.]

- b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Developed.

The operational concept for the use of the M113 as an armored evacuation vehicle is sound and since the AMEV shall replace the M113 on a one-for-one basis there seems to be little reason to change that concept. Additionally no one seems to have any idea where to find a copy of this operational concept, it was probably written in the 1950s during the Korean War. The basic concept for the treatment and evacuation of battlefield casualties was designed by Jonathan Letterman during the Civil War and little has changed since except the equipment.

22. Approved documentation (e.g., MNS, ORD, BOIP).

- a. MNS. Yes.

Approved Dec 95.

- b. ORD. Yes.

Approved Oct 96.

- c. BOIP. No.

Not yet. BOIP, MDEP, and SSN: TBD.

One for one Replacement of LINs C18234 and D12087, M113A2/A3 armored personnel carrier. Estimated Table of Organization and Equipment (TOE) requirements 1518 (Force Package I 174; Force Package II 168; Force Package III 446; and Force Package IV 703).

23. CSS E/I training in TRADOC schools. No.

24. Examined in

a. TF XXI AWE (Mar 97). Yes.

Evacuation configuration tested favorably in TF XXI AWE. A non-official email report of the CSS portion of the OPTEC test report on the AMEV at the NTC rotation in support of Task Force XXI indicates that the AMEV performed well. The final OPTEC test report is scheduled to be released on 1 July 1997.

[a. As of this date (22 Jul 97) the AMEDDC&S did not provide this study team with any final OPTEC test report. However, OPTEC may not have released such as of yet.

b. CASCOM's 14 Apr 97 (on/about) briefing to Congressman Sisisky (VA) on TF XXI Emerging Insights indicated that: "... CSS Successes-NTC. ...AMEV." However, no support for this conclusion was found in the briefing charts reviewed by this author.

c. CDR CASCOM's 23 Apr 97 TF XXI briefing charts to the C&GSC list the AMEV as a CSS initiative, but present no test results. This briefing then lists the AMTV as a CSS initiative identified as a Warfighter Rapid Acquisition (WRAP) program candidate. But TRAC-LEE's May 97 TF XXI Emerging Results briefing charts only list the AMTV (and not the AMEV) as a TF XXI medical initiative, and indicate that: "...Medical initiatives- indications based on the SME are that these initiatives saw little use during the AWE...analysis continuing..."]

b. TRAC's Div Design Analysis Study. No.

c. The Nov 97 DAWE. No.

25. Tested elsewhere. No.

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. No.

27. Planned BOIP (connectivity between FPs). Yes.

Actual BOIP is yet to be developed. However, plans call for fielding the AMEV to all four FPs.

28. Technical capabilities. Proven.

Proven in TF XXI.

["Proven in TF XXI" is based on the SME's military judgment. No TF XXI test results have been made available to this author to date. Also, the SME indicated "I think the technical capabilities of the Bradley Fighting Vehicle are well proven. If the Bradley vehicle chassis is chosen for the AMEV, then the technical capabilities seem clear." Also, no information was provided concerning the demonstrated use of the prerequisite Force XXI Battle Command- Brigade and Below (FBCB2)-CSS Functionality in the AMEV.]

29. LIA's 15 elements of ILS assessment. Unknown.

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). Unknown.

[SME indicated that fielding the AMEV would occur in time for the First Digitized Division if the Bradley platform is chosen and the program is funded.]

b. In time for the First Digitized Corps (2006). Unknown.

[SME indicated that fielding the AMEV would occur in time for the First Digitized Corps if the Bradley platform is chosen and the program is funded.]

c. During FY 07-10. Unknown.

Plans call for fielding the AMEV to all four FPs before FY 2010.

31. Overall Peacetime (Programmatic) risk. Red.  
Complete lack of funds, lack of sufficient testing.

[Also, the prerequisite "FBCB2-CSS Functionality" was assigned an "Amber" peacetime risk in its CEFA assessment.]

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.  
The Bradley C2V is a proven technology.

33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation. Medium

[The AMEDDC&S SME indicated that the AMEV must have FBCB2-CSS Functionality for medical situational awareness. The CASCOM SME for FBCB2-CSS Functionality estimated an "Amber" (Medium) wartime employment risk.]

34. Wartime backup (BU) system. The M113 Armored Ambulances would be removed from the force structure with the fielding of the AMEV. Thus, BU systems for the AMEV would have to be then-fielded wheeled ambulances. These would have to come closer to the battle area, thereby becoming exposed to an increased threat to indirect fires. Also, AMEVs, if available, from sister units could serve as a BU to any given single AMEV.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. N/A.  
Some form of wheeled ambulances would likely be available for a BU system.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available.  
Medium.  
Wheeled ambulances would be required to execute the evacuation mission, and they are not capable of providing the level of protection desired for either the patients or the crew.



37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Medium.

[SME indicated that the AMEDDC&S plans to field the AMEV to all four FPs if there is enough money. If not, then performance of patient evacuation would be severely degraded in those units not having the AMEV.]

38. Other adverse wartime impacts (e.g., scenario dependent). None.

39. Overall wartime risk associated with employment of this CSS E/I. Amber.

[SME responded "Green." However, this study team assigned an "Amber" given the wartime risk associated with employment of the prerequisite FBCB2-CSS Functionality.]

40. Overall risk (considering both programmatic and wartime risks). Red.  
Lack of funds.

[SME assessed the AMEV programmatic risk as being "Red."]

41. Ordinal ranking of this CSS E/I by the CSS DCDs.

42. Cardinal ranking of this CSS E/I by the CSS DCSs.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities. N/A.  
The AMEV was not listed in this Plan.

44. Remarks. The AMEV is superior to the M113 Armored Ambulance in all areas. Most notable are patient treatment, mobility, NBC overpressure, armor protection, and environmental control.

45. Data Sources. MAJ Sadler, CPT Hardy, and LTC Habib, AMEDDC&S, DSN: 471-0706.  
AMEDDC&S' 13 May 97 draft input to CASCOM's 1997 CSSMMP.

1. Title. Armored Medical Treatment Vehicle (AMTV)

2. Designation. FXXI CSS Initiative.

Provides medical platoons and forward medical companies with an enhanced armored vehicle platform upon which emergency medical treatment can be performed inside of the vehicle under protection of armor. Replaces the M577 Battalion Aid Station (BAS).

a. Description:

(1) The Armored Medical Treatment Vehicle (AMTV) replaces the M577 Battalion Aid Station (BAS). This system provides the medical platoons and forward medical companies with an enhanced armored platform upon which emergency medical treatment can be performed inside the vehicle under the protection of armor.

(2) The AMTV is linked to the Bradley Command and Control Vehicle to replace the 1960s vintage M577 Command Post Carrier, now diverted to medical missions, with a system capable of delivering modern standards of care on the battlefield. Designed for use in armored warfare (Heavy Division scenarios) the AMTV will replace the M577 on a one-for-one basis in medical units.

(3) The AMTV overcomes shortcomings in the M577 by providing adequate space and equipment for a trauma treatment team to provide emergency medical treatment inside of the vehicle. The M577 is currently used only to transport the team and equipment. The team must unload the equipment from the vehicle and provide treatment outside. This process is time consuming and exposes the medical team and casualty to battlefield hazards, thus reducing their survivability.

(4) The AMTV will have the communications and situational awareness capabilities, compatible with the force it supports, which will be necessary to survive and provide support on the 21st Century battlefield.

b. Characteristics: The AMTV projects and sustains the force through:

- \* improved survivability from enhanced armor protection;
- \* improved automotive, electrical, communications, interior design, environmental support, chassis compatibility, and machine/soldier interface;
- \* increased operational mobility (allowing mobility equal to supported forces); and
- \* decreased mortality and morbidity due to the addition of on-board medical treatment capability.

c. Requirement/Need/Mission: The AMTV overcomes shortcomings in the M577 Command Post Carrier by providing adequate space and equipment for a trauma treatment team to provide emergency medical treatment inside the vehicle. This medical treatment system is required to rapidly treat, and return combat soldiers to duty. Our armored forces have a need for an armored treatment vehicle that is capable of keeping up with supported forces and provides close combat medical treatment in support of Army operations. The Army Plan indicates a need to acquire

enhanced and modern treatment capabilities. This requirement is identified in the Army Modernization Plan. An armored treatment vehicle will correct known deficiencies in the currently used tracked Battalion Aid Station (M577): inadequate casualty treatment capacity; poor patient and attendant ride stabilization; limited patient in-transit support by aid men, inadequate space for supplies, equipment, and personnel; and no collective NBC protection. Furthermore, the M577 is a command post vehicle, not a dedicated medical treatment system. The M577 has the additional deficiency of not being able to keep up with the units it supports on the battlefield. If not funded, armored units will continue to use a command post vehicle which is inadequate for its stated mission and hence contributes to higher mortality and morbidity rates.

### 3. DTLOMS Area.

#### a. Primary: Materiel.

The AMTV program is linked to the Bradley C2V program because the best suited vehicle type for the mission, in production, is a modified C2V.

#### b. Secondary: Soldiers

### 4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Both

The AMTV will have the communications and situational awareness capabilities, compatible with the force it supports, which will be necessary to survive and provide support on the 21st Century battlefield.

### 5. CSS BOS Function.

#### a. Primary: Man.

#### b. Secondary: None.

### 6. FXXI Priority. High.

Ranked number 3 of 13 approved Medical Future Operational Capabilities in TRADOC Pam 525-66, dated 1 Dec 1996.

[This study team could not locate (a) the cited TRADOC Pamphlet 525-66, dated 1 Dec 96. However, TRADOC Pamphlet 525-66, dated 1 May 97, page 105, paragraph 4-17, MD 97-001(b) discusses "Patient Evacuation- Ground Evacuation." And (b) any reference that the ordering of these paragraphs indicated a "ranking."]

### 7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. None.

[AMTV was not listed in this Plan.]

### 8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed

### 9. The 1996 US Army Modernization Plan. Reviewed.

[a. As input to the 1997 Army Modernization Plan, in the Fall of 1996 the AMEDDC&S recommended the AMTV as their #1 priority in the Combat Health Support Annex. This author notes that as a part of this CEFA, he was advised by the AMEDDC&S that they also ranked the Armored Evacuation Vehicle (AMEV) as their #1 priority for the proposed 1997 Army Modernization Plan Combat Health Support Annex.

b. With respect to the 1996 version of the Army Modernization Plan: Page L-7 discusses Patient Evacuation and indicates that: "... Patient Evacuation is the Army's number one medical readiness shortfall and the AMEDD's first priority." This Plan rated this capability as "Red" for the entire FXXI years (FY 98-10) since "... limited resources exist to provide evacuation to the force. ...Ground evacuation units continue to use outdated ground ambulances that cannot keep pace with supported ground units and that do not have an on-board medical treatment capability under the protection of armor...."]

10. Prerequisite(s).

a. FXXI E/Is. CSS.

FBCB2-CSS Functionality. The AMEV is going to use FBCB2-CSS Functionality for situational awareness.

b. Other prerequisites. None.

11. Overall risk status of

a. Prerequisite E/Is. Medium

[FBCB2-CSS Functionality CEFA assessment indicated an overall risk rating of "Amber" (Medium).]

b. Other prerequisites. N/A.

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. None.

[FBCB2-CSS Functionality will continue to be developed even if the AMEV program is discontinued.]

b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? None.

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? None.

16. Supporting analytical studies. Yes.

Analysis of Alternatives (AOA) for the Armored Treatment and Transport Vehicle (ATTV), dated 14 May 96.

[SME indicated that this AOA may not have been approved.]

17. Changes in manpower requirements caused by fielding this given CSS E/I. None.

The planned AMTV will replace the M577 with equivalent real sizes.

[Note: no information was provided as to the possible effect this planned replacement of each M577 (M113-based chassis) by an ATTV (Bradley-based chassis) would have on the FXXI maintenance system.]

18. Related changes in CSS efficiency. Increase.

YES. A non-official email report of the CSS portion of the OPTEC test report on the AMTV at the NTC rotation in support of Task Force XXI indicates that the AMTV performed well. The final OPTEC test report is scheduled to be released on 1 July 1997.

19. Related changes in CSS effectiveness. Increase.

A non-official email report of the CSS portion of the OPTEC test report on the AMTV at the NTC rotation in support of Task Force XXI indicates that the AMTV performed well. The final OPTEC test report is scheduled to be released on 1 July 1997. The AMTV will not only be able to keep up with the armored maneuver force but will be medically equipped to provide emergency treatment inside the vehicle. The M577 must stop, unload and provide treatment outside. The AMTV meets or exceeds all requirements outlined in the TRADOC approved ORD.

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself). None. The AMTV is a one for one replacement in medical units - 1 AMTV for 1 M577. The vehicle will not affect a change in personnel or equipment.

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Developed.

Developed and approved (FM 8-10-6, Medical Evacuation in a Theater of Operations, 8 Mar 94.).

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. Yes.

Approved Dec 95.

b. ORD. Yes.

Approved Oct 96.

c. BOIP. No.

BOIP TBD. One for one Replacement of LIN D11538, M577. Estimated TOE requirements 534 (Force Package I 70; Force Package II 60; Force Package III 132; and Force Package IV 272).

23. CSS E/I training in TRADOC schools. No.

24. Examined in

a. TF XXI AWE (Mar 97). Yes.

The AMTV tested favorably and was the most forward support vehicle at times.

A non-official email report of the CSS portion of the OPTEC test report on the AMTV at the TF XXI NTC rotation indicates that the AMTV performed well. The final OPTEC test report is scheduled to be released on 1 July 1997.

[a. Briefing slides received from CASCOM o/a 17 Apr 97 containing OPTEC emerging results indicated that: "...Emerging results: High level of user acceptance as a replacement for the M577A2. Successfully used in both a treatment and transport role during the AWE. AMTV was deployed forward with BDR Recon element and demonstrated its mobility and survivability. Medical personnel were able to perform enroute treatment during casualty evacuation. Crew was able to move and communicate using applique.... Limited use during AWE. SMEs questioned the survivability of the vehicle, i.e., 'too big and bulky.' Vehicle was able to perform in a transport role; however, the patients felt unsafe in the vehicle (speed of the vehicle; distance between litters). Medical personnel were able to perform limited (sic) enroute treatment during casualty evacuation."

b. CASCOM 9 Jun 97 briefing charts for BG Dayan (Israeli Army) indicate: "... AWE insights. High level of user acceptance (by medics) as a replacement for the M577A2. Soldiers transported via the AMTV expressed concerns that the ride is too unstable to provide effective combat health care."

c. TRAC-LEE's May 97 TF XXI Emerging (CSS) Results briefing charts list the AMTV as a TF XXI medical initiative, and indicate that: "....Medical initiatives- indications based on the SME are that these initiatives saw little use during the AWE...analysis continuing..."]

b. TRAC's Div Design Analysis Study. No.

c. The Nov 97 DAWE. No.

25. Tested elsewhere. Yes.

The Concepts Experimentation Program (CEP) Test is currently ongoing at Ft. Hood, TX. Preliminary reports will probably not be available until August 1997.

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. No.

27. Planned BOIP (connectivity between FPs). Yes.

Actual BOIP is yet to be developed. However, plans call for fielding the AMTV to all four FPs as a one-for-one replacement for the M577.

28. Technical capabilities. Proven.

The technical capabilities of the Bradley Fighting Vehicle are well proven.

[The SME also cited the TF XXI AWE as proof for the AMTV's technical capabilities. However, as stated above: "... TRAC-LEE's May 97 TF XXI Emerging (CSS) Results briefing charts list the AMTV as a TF XXI medical initiative, and indicate that: "...Medical initiatives-indications based on the SME are that these initiatives saw little use during the AWE...analysis continuing..."]

29. LIA's 15 elements of ILS assessment. Unknown.

30. Fielding schedule.

- a. In time for the First Digitized Div (Sep 2000). Unknown.

[SME indicated that fielding the AMTV would occur in time for the First Digitized Division if the AMTV were funded; therefore, this study team elected to assign an "Unknown."]

- b. In time for the First Digitized Corps (2006). Unknown

[SME indicated that fielding the AMTV would occur in time for the First Digitized Corps if the AMTV were funded; therefore, this study team elected to assign an "Unknown."]

- c. During FY 07-10. Unknown.

Plans call for fielding the AMEV to all four FPs before FY 2010.

31. Overall Peacetime (Programmatic) risk. Red.

Lack of Funds.

[SME assigned this "Red" response based on the complete lack of funds.]

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.

The Bradley C2 vehicle is a proven technology.

33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation. Medium

[The CASCOM SME for the FBCB2-CSS Functionality assigned an "Amber" risk for its wartime employment.]

34. Wartime backup (BU) system. Given that current M577's would be removed from the force structure, a BU system to the planned AMTV would be any wheeled ambulance in the area. Also, the use of other AMTVs, if available, from sister units could serve as a BU system.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. N/A. There likely will be some form of wheeled ambulance available as a BU in the event a given AMTV is not available.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. Medium. Wheeled ambulances would be required to execute the evacuation mission, but they could not provide the degree of protection desired for either the patients or the crew.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Medium. Given enough money, plans call for fielding the AMTV to all four FPs. However, if the AMTV is only fielded say to FP 1 units, then medical evacuation in support of units in the remaining FPs would be severely degraded.

38. Other adverse wartime impacts (e.g., scenario dependent). None.

39. Overall wartime risk associated with employment of this CSS E/I. Amber

[SME responded "Green." However, this study team assigned an "Amber" given the wartime risk associated with employment of the prerequisite FBCB2-CSS Functionality.]

40. Overall risk (considering both programmatic and wartime risks). Red.  
Lack of funds.

41. Ordinal ranking of this CSS E/I by the CSS DCDs.

42. Cardinal ranking of this CSS E/I by the CSS DCSs.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities. N/A.  
The AMTV was not listed in this Plan.

44. Remarks. The AMTV is superior to the M577 in all areas. Most notable are patient treatment, mobility, NBC overpressure, armor protection, and environmental control.

45. Data Sources. Source: MAJ Sadler and CPT Hardy, AMEDDC&S, DSN: 471-0706.  
AMEDDC&S' 13 May 97 draft input to CASCOM's 1997 CSSMMP.



1. Title. Ballistic Protection System (BPS).

2. Designation. FXXI CSS Initiative.

a. Description: The BPS is a modular fragmentation protective cover designed for use by all Army units to enhance protection of ammunition and equipment.

b. Characteristics:

- Sizes; 1' x 2', 2' x 4', and 4' x 8' (prototypes)
- Weighs 1.2 lb./square foot
- Uses velcro and grommets for attachment
- Outer shell of camouflage fabric and inner layer of aramid fiber material

c. Requirement/Need/Mission: Defense Ammunition Logistics Activity generated a concept for a camouflage cover for tactical wheel vehicles in 1987. In 1990, the Amphibious Warfare Technology Directorate, Marine Corps Systems Command initiated a ballistic protective fabric program to enhance protection of tactical support vehicles against artillery fragmentation and small arms. The Combined Arms Support Command and the TRADOC Munitions System Manager is the Combat Developer. Natick RD&E Center is the Materiel Developer.

The BPS provides ballistic fragmentation protection for ammunition, petroleum, weapon system components and supply items. Deployed units will use BPS during war and operations other than war for protection, reducing detection/identification of supplies and equipment. BPS has tremendous soldier acceptance and was used by the 3rd Infantry Division in Operation Able Sentry. No known similar systems are deployed by Department of Defense (DOD) or allied nations. The Army currently uses bunkers and labor intensive earth berms to protect ammunition.

d. Milestones: Contract Award is estimated for 4th Quarter, FY97.

3. DTLOMS Area.

a. Primary: Materiel.

b. Secondary: None.

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Modernization.

5. CSS BOS Function.

a. Primary: Arm.

b. Secondary: Fuel, Distribute.

6. FXXI Priority. Medium  
Within the CASCOM (DCD-Ord).

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. Low.

[BPS was prioritized # 48 out of 51 items. Also, BPS was prioritized # 19 out of 21 Ordnance items.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed.

9. The 1996 US Army Modernization Plan. Reviewed.

[On page I-10 of this Plan in the CSS Equipment portion of the Sustain The Force section BPS is mentioned. "... Soft shelters support the warfighter in all areas of the battlefield from manportable tentage for dismounted soldiers, and vehicle crew tents, to chemical/biological hardened tentage for medical hospital. Soft shelters provide protection from climatic extremes as well as battlefield threats, while minimizing weight and volume. Current programs include the Large Area Night Maintenance Shelter... Ballistic Protection Shelter, and Ammunition Solar Shades." This program was "...rated "Amber" for near-,mid-, and far-terms (FY 96-11). Funding shortfalls have delayed the research and development of the Laundry and Dry cleaning System, and soft shelter programs. Mid-and-far-term funding is not sufficient to carry out planned field and food service equipment and soft shelter modernization program."]

10. Prerequisite(s).

a. FXXI E/Is. None.

b. Other prerequisites. None.

11. Overall risk status of

a. Prerequisite E/Is. N/A.

b. Other prerequisites. N/A.

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. N/A.

b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? None.

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? None.

16. Supporting analytical studies. None.

None are available.

[SME stated that the BPS is an ACAT III system. Therefore no COEA/AOA may have been required. SME referenced the HQ TRADOC 201644Z May 93 message which indicates that unless otherwise directed COEAs would not be performed for ACAT III/IV systems.]

17. Changes in manpower requirements caused by fielding this given CSS E/I. None.

18. Related changes in CSS efficiency. Increase.

The BPS will provide an increase in ballistic protection compared to that provided today by the use of bunkers and labor intensive earthen berms. The BPS may allow the establishment of temporary Ammunition Storage Points (ASPs) without earthen berms or bunkers.

19. Related changes in CSS effectiveness. Increase.

Increasing Class (CL) V explosive safety will in turn contribute to the maneuver commander's overall combat effectiveness.

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself). None.

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Developed

The Operational Mode Summary contained in the approved ORD is being used as the BPS Operational Concept.

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. Yes.

[SME did not provide the approval date for the BPS MNS.]

b. ORD. Yes.

Approved in a HQ TRADOC 24 Mar 97 which approved the 15 Jan 97 ORD.

c. BOIP. N/A.

TOTAL REQUIREMENT: The BPS will be a Common Table of Allowance (CTA) item, and total systems could exceed 50,000.

23. CSS E/I training in TRADOC schools. No.

Not yet. When the BPS is finally fielded, training on ammunition protection procedures will likely not change much.

24. Examined in

- a. TF XXI AWE (Mar 97). No.
- b. TRAC's Div Design Analysis Study. No.
- c. The Nov 97 DAWE. No.

25. Tested elsewhere. Yes.

There have been many successfully BPS test conducted over the last several years. Most noteworthy was the Army Research Lab (ARL) Feb 93 test sponsored by the USMC at Aberdeen Proving Grounds, MD. Test results provided the preferred BPS fabric (weave). There were other tests on "penetration" protection. Test documentation is on file with the CASCOM SME.

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. No.

Even though the BPS has an approved MNS and ORD, a production funding line has not been identified beyond FY96. Procuring agency is the DLA.

27. Planned BOIP (connectivity between FPs). N/A.

The BPS will be a CTA item and to be drawn from supply by units when required. The required number of BPS is estimated at 1115 per heavy division. This is one per flatrack, as based only on PLS flat racks for 30 days of on-ground CL V storage.

28. Technical capabilities. Proven.

Refer to paragraph 25 above and the Feb 93 ARL test.

29. LIA's 15 elements of ILS assessment. Not Assessed.

30. Fielding schedule.

- a. In time for the First Digitized Div (Sep 2000). No.  
Lack of funds.

- b. In time for the First Digitized Corps (2006). Unknown.

- c. During FY 07-10. Unknown.

31. Overall Peacetime (Programmatic) risk. Amber.

Technical capabilities have been proven. However, sufficient funds are not available.

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. None.

33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation. N/A.

34. Wartime backup (BU) system. Available camouflage nets, tarps or time consuming development of earthen berms will not protect CL V/supplies from direct enemy hits. Thus, no real BU system exists.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. Medium. CL V/supplies would then be exposed to enemy action.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. N/A.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Medium. Units not receiving the BPS would have to rely on present day tarps, camouflage nets and development of earthen berms for protection. These ammunition storage areas would then be subjected to a higher likelihood of not surviving an enemy attack than units employing the BPS.

38. Other adverse wartime impacts (e.g., scenario dependent). None.

39. Overall wartime risk associated with employment of this CSS E/I. Green.

[SME did not think that the lack of a firm BU system to the BPS would lower this rating to "Amber." This study team agreed.]

40. Overall risk (considering both programmatic and wartime risks). Amber. Due to lack of funds.

41. Ordinal ranking of this CSS E/I by the CSS DCDs.

42. Cardinal ranking of this CSS E/I by the CSS DCDs.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities.

44. Remarks. None

45. Data Sources. CPT (P) Yarberry, CASCOM (DCD-ORD), DSN: 687-0250. CASCOM Sep 96 CSSMMP and related May 97 updates.

1. Title. Cargo Bed Covers.

2. Designation. FXXI CSS Initiative.

a. Description: CBC are general purpose, low-cost, rigid top covers providing environmental protection for items in the cargo bed of their associated carriers. CBC will be Non-Developmental Items (NDI).

b. Characteristics: Standardized CBC, mounted on various Tactical Wheeled Vehicles (TWV) and trailers, will replace bow/canvas covers and non-standard plywood "shelters."

- low-cost
- lightweight
- weather tight
- lockable to prevent pilferage
- blackout capabilities
- collapsible to permit internal air transport

c. Requirement/Need/Mission: The Army has a requirement for standard CBC to protect, store, and secure equipment, tools, and pilferable supplies while being transported on TWV. Existing CBC are non-standard, unstable, bulky, costly, and unsafe. Current shelters or covers, when mounted on 2 1/2-ton or 5-ton trucks, prevent the vehicles from rolling on or off C-130 aircraft. Standardized CBC, mounted on various TWV and trailers, will be a CTA item replacing bow/canvas covers and non-standard plywood "shelters". CBC are rigid top covers, not shelters. CBC for 2 1/2 & 5-ton vehicles will be "collapsible" to permit internal air transport. TRADOC approved CBC Mission Need Statement in Oct 91 and ORD in Feb 95.

d. Milestones: MS 1 Demonstration and Validation Phase.

3. DTLOMS Area.

a. Primary: Materiel.

b. Secondary: None.

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Modernization.

5. CSS BOS Function.

a. Primary: Fix.

b. Secondary: Distribute.

6. FXXI Priority. Low.

[CASCOM SME indicated that the CBC is a "Low" priority.]

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. Low.

[CBC was prioritized # 47 out of 51 total items. It also ranked #18 out of 21 Ordnance items.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed.

9. The 1996 US Army Modernization Plan. Not Reviewed.

10. Prerequisite(s).

a. FXXI E/Is. None.

b. Other prerequisites. None.

11. Overall risk status of

a. Prerequisite E/Is. N/A.

b. Other prerequisites. N/A.

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. N/A.

b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? None.

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? Specify.

[The CASCOM SME indicated that the Family of Medium Tactical Vehicles (FMTV) would benefit by fielding the CBC. However, the CASCOM did not designate the FMTV to be a "FXXI CSS enabler/initiative." In support of the CBC program, this study team elected to indicate here that the FMTV would benefit by CBC fielding.]

16. Supporting analytical studies. None.

17. Changes in manpower requirements caused by fielding this given CSS E/I. None.

18. Related changes in CSS efficiency. Increase.

Yes, more durable and there will be less pilferage of supplies and tools while being transported on TWV. Also, they will be lightweight, collapsible to permit internal air transport, and will possess blackout capabilities.

19. Related changes in CSS effectiveness. Increase.

Yes, they will better protect cargo and personnel than what we currently use.

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself). None.

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. N/A.

No concept required.

22. Approved documentation (e.g.: MNS, ORD, BOIP).

a. MNS. Yes.

MNS approved in 1991.

b. ORD. Yes.

ORD was approved 13 Feb 95.

c. BOIP. N/A.

The CBC will be issued as a CTA item.

23. CSS E/I training in TRADOC schools. N/A.

None required.

24. Examined in

a. TF XXI AWE (Mar 97). No.

b. TRAC's Div Design Analysis Study. No.

c. The Nov 97 DAWE. No.

25. Tested elsewhere. Yes.

CBC were tested at the Aberdeen Proving Grounds, MD; and at the YUMA Proving Grounds, (both test dates unknown to the SME). SME indicated that he had no hard test data results, but that both tests went well (SME-MJ). After these tests the Army went on to request procurement funds for the CBC.

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. No.

CBC are considered a low priority.

PROGRAM FUNDING: Estimated Cost: High Mobility Multipurpose Wheeled Vehicle (HMMWV) \$2,332 ea., M35/Light Medium Tactical Vehicle (LMTV) \$5,493 ea., M105 \$3,548 ea., \$725K Research, Development, Test and Engineering (RDTE) for FY 96, (MDEP) RJCO.



27. Planned BOIP (connectivity between FP). Yes.

Procurement dollars are being requested to field the CBC to all four FP.

28. Technical capabilities. Proven.

The CBC is to be a NDI. Its technical capabilities have been proven in the commercial sector.

29. LIA's 15 elements of ILS assessment. Assessed.

[This study team was able to determine that OPTEC did conduct an ILS review for the CBC. However, limited study time precluded any further attempts to acquire their assessment.]

30. Fielding schedule.

a. In time for the First Digitized Division (Sep 2000). Unknown  
No funds to date.

b. In time for the First Digitized Corps (2006). Unknown.  
No funds to date.

c. During FY 07-10. Unknown.

31. Overall Peacetime (Programmatic) risk. Amber.

Technical capabilities have been proven (CBC to be a NDI); however, no procurement funds.

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.

33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation. N/A.

34. Wartime backup (BU) system. There will be no specially designated BU system for the CBC. However, cargo could be covered by tarps or whatever else is available. Also, units will locally fabricate CBC and built-up shelters.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. N/A.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. Low. Units will locally fabricate CBC and built-up shelters which are costly, unsafe, non-standard, unstable, and which may prevent vehicles from rolling on or off C-130 aircraft. If the CBC is not present or is damaged, then use of BU tarps or other coverings will not adequately protect cargo from outside environmental influences.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. None.

38. Other adverse wartime impacts (e.g., scenario dependent). None.

39. Overall wartime risk associated with employment of this CSS E/I. Green.

40. Overall risk (considering both programmatic and wartime risks). Amber.  
Technical capabilities have been proven (CBC to be a NDI); however, no procurement funds.
41. Ordinal ranking of this CSS E/I by the CSS DCD.
42. Cardinal ranking of this CSS E/I by the CSS DCD.
43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities.
44. Remarks. None
45. Data Sources. CW5 Parker, CASCOM (DCD-ORD), DSN: 687-0585. CASCOM Sep 96 CSSMP and related May 97 updates.

1. Title: Combat Service Support Control System (CSSCS).

2. Designation: FXXI CSS Initiative.

a. Description: CSSCS is the combat service support node of the Army Tactical Command and Control System (ATCCS). It is an automated system that will furnish theater and force level commanders and their staffs with CSS command and control (C2) information. It will enable the mutual exchange of mission-critical data among the five ATCCS Battlefield Functional Areas and serve as a platform for Standard Army Management Information Systems (STAMIS) data integration. Version 3 provides an initial automated CSS C2 capability to Corps and below users. For Corps and below users and tactical Echelon above Corps users, Versions 4 and 5 will add major functionality such as transportation, medical, maintenance, personnel, embedded training, logistics planning, resource management, field services, and implement joint, allied, and coalition capabilities.

b Characteristics:

- Uses Common Hardware and Software (CHS) equipment from the CHS-II Contract.
- Interfaces with fielded CSS STAMIS and hardware.
- Interfaces with other C2 systems (All-Source Acquisition System (ASAS), Movement Control System (MCS), Forward Area Air Defense Command, Control and Intelligence (FAADC2I), Advanced Field Artillery Tactical Data System (AFATDS) , Army Global Command and Control System (AGCCS).
- Mounted in Standard Integrated Command Post Shelter (SICPS)--tents, rigid wall shelters, M-1068 track, and 5-ton vehicles.
- Operates over tactical and commercial communications networks.

c. Requirement/Need/Mission: Required to correct the deficiencies of the current manual CSS C2 system/process that severely hampers the ability of the CSS commanders to provide and sustain the force. CSSCS provides the CSS command and staff with automated critical C2 information to effectively manage resources in support of battlefield operations.

3. DTLOMS Area.

a. Primary: Materiel.

b. Secondary: Training, Leader Development.

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Digitization.

Currently CSSCS is just digitizing a manual basecase system. The Objective CSSCS will use then existing technologies and insert same into CSSCS, thereby both modernizing AND digitizing the basecase system.

5. CSS BOS Function.

a. Primary: Arm, Fuel, Fix, Man, Distribute, Sustainment Engineering.

Reason-CSSCS will give situational awareness of actions in all these areas. It should be noted that CSSCS also applies to the Command and Control BOS. CSSCS is under the Army Battlefield Control System (ABCS) capstone requirement.

b. Secondary: None.

6. FXXI Priority. High.

TRADOC's highest CSS priority for the First digitized Div.

[Source: CASCOM SME's judgment as based on a Jan 97 briefing that CDR TRADOC gave to the CSA. CASCOM SME indicate that he would provide the CEFA Team a copy of this briefing, but none has been received to date.]

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. High.

[CSS C4 was rated #1 out of 51 candidates, with CSSCS as part of the CSS C4 package. CSSCS was rated #3 out of 6 CSS C4 actions.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Briefed.

[a. Briefing charts (a) indicate that CSSCS was labelled as "Green" for money in the POM or programed to be in the POM for the First Division equivalent by FY 2000 or before, and (b) recommended that CSSCS receive an additional \$9.0M by FY 03 and an additional \$17.0M by FY 06. Such would provide for LOG C2 at Brigade (BDE), and would initiate capability for LOG C2 at Battalion (BN) for FP 1 and 2.]

9. The 1996 US Army Modernization Plan. Reviewed.

[CSSCS was rated Amber for FY 96-98; Amber for FY 99-01; Green for FY 02-11. From page I-6, The Army Mod Plan: "The near-and-mid term CSSCS program was rated Amber due to extended procurement duration. Reduced procurement slows the conversion to integrated, automated decision-making capabilities, and causes CSS commanders in FP 2 and 3, Army National Guard, and Army Reserve units to use less efficient, slower, manual information management tools. Programs for the far-term will increase procurement, hence the Green rating."]

10. Prerequisite(s).

a. FXXI E/Is. None.

[However, for example consider the Medical FXXI MSAC initiative. The Medical Situational Awareness and Control (MSAC) SME indicated that the MSAC is to be the medical module of the CSSCS. (Refer to the MSAC CEFA assessment where MSAC is rated "Red." This rating occurred because the MSAC SME stated that MSAC requires FBCB2-CSS Functionality, which is rated "Red." ) The CASCOM's CSSCS SME never listed MSAC, for example, as a prerequisite for his CSSCS FXXI Initiative. Such, however, is consistent with fielding an early version of the CSSCS,

and with the verbiage contained in paragraph 2a above in which "future" CSSCS versions 4 & 5 will add, for example, medical capabilities.]

b. Other prerequisites. CS.

The Warfighter Information Network (WIN) will satisfy communication requirements essential to ABCS information exchange.

11. Overall risk status of

a. Prerequisite E/Is. N/A.

b. Other prerequisites. N/A.

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. N/A.

b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? Specify. FBCB2 requires the CSSCS in order to send CSS situational awareness and CSS C2 information up beyond BDE level.

[a. Although not designated by CASCOM as a FXXI CSS E/I the Battlefield Distribution (BD) concept depends on CSSCS for logistical situational awareness so the Army can change from a supply-based system to a distribution-based system.

b. The Force Manning System (FMS) also requires the CSSCS, refer to the FMS CEFA assessment. This study team does not know the rationale as to why, for example, the FMS submodule of CSSCS is being listed as its own separate FXXI CSS initiative, as well as for example the MSAC FXXI CSS Initiative; but, the Adjutant General (AG) School SME when providing FMS responses to his respective CEFA assessment indicated that FMS "requires" the CSSCS, whereas the USAMEDDC&S SME when providing MSAC input to the CEFA did not indicate similar. This was not resolved.]

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. Medium. The CSS piece of FBCB2 would not be effective, as information would not pass upwards beyond BDE. Consequently, the development of the CSS piece of FBCB2 might then have to be modified, perhaps causing fielding delays.

[Similarly, the FMS is the planned upgrade to the CSSCS's personnel submodule. Without CSSCS the personnel community would have to rely on manual/less efficient procedures to acquire and process personnel-related information.]

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? Specify.

Many other automated systems would benefit from CSSCS's CSS situational awareness information.

16. Supporting analytical studies. Yes.

The 26 Feb 97 CSSCS Modified Integrated Program Summary (MIPS), as approved by the CSSCS TSM on 14 Mar 97; the TRAC-Studies and Analysis Center (TRAC-SAC) CSSCS COEA (date unknown by SME); and test evaluation reports for Independent Operational Test & Evaluation (IOTE).

17. Changes in manpower requirements caused by fielding this given CSS E/I. Unknown. Basis is SME-Military Judgment (MJ) as well as GEN Sullivan and Honorable Togo West in their Jan 95 FXXI pamphlet (Page 18): "...Digitization provided by CSSCS shows a 28% to 95% reduction in the man-hours required for key events along the CSS critical path for supporting the force." There will be less staff in all staff planning elements due to increased information processing and capability.

18. Related changes in CSS efficiency. Increase.

CSSCS will permit more timely and accurate passing of CSS information. Per MG Lehowitz's (OPTEC) 20 Feb 97 Test & Evaluation report: "...CSSCS demonstrated the capability to improve speed and accuracy of logistics planning, to track critical materiel resources, and to maintain an accurate common picture of the battlefield logistics situation. Per GEN Sullivan and Honorable Togo West in their Jan 95 FXXI pamphlet (Page 18): "...Digitization provided by CSSCS shows a 28% to 95% reduction in the man-hours required for key events along the CSS critical path for supporting the force." Further support for increases in efficiencies is found in the 26 Feb 97 CSSCS MIPS.

19. Related changes in CSS effectiveness. Increase.

Basis is (a) CSSCS 26 Feb 97 MIPS, page 4: "...CSSCS enables the commander to make timely, relevant decisions and provides the ability to conduct the "push" system of logistics which is essential in maintaining synchronization and battle tempo in the fast-paced, non-linear battlefield. Additionally, CSSCS as the integral component of the ATCCS provides the "common picture" across the battlefield, to include joint and host nation interoperability."

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself). None. However, CSSCS itself will require in each Div an additional 25 more computers all dedicated to CSSCS. These are costed as part of the CSSCS program. Assumption is that they will operate with current manpower/Moss in the TOE units, as CSSCS is a replacement for the current combination manual-automated systems.

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Developed

Developed and approved as part of the 1994 ORD, as updated Apr 97.

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. Yes.

Approved Oct 91.

b. ORD. Yes.

Approved Oct 94, and updated Apr 97.

c. BOIP. Yes.

Approved Aug 94.

23. CSS E/I training in TRADOC schools. No

Not yet. CSSCS will, however, become a part of professional development in selected blocks of TRADOC instruction.

24. Examined in

a. TF XXI AWE (Mar 97). Yes.

[No official OPTEC report released yet. Per MG Guest in his 23 Apr 97 briefing to CGSC on the TF XXI AWE: "... CSSCS Insights. CSSCS provided maneuver commanders with critical logistical situational awareness...enabling them to make key decisions." Per CASCOM Battle Lab 14 Apr 97 briefing to Congressman Sisisky: "...CSSCS...showed potential." Per SME: (a) the TF XXI AWE had 12 CSSCS computers there which all worked 99% of the time, and (b) the CSSCS performed as required during the AWE.]

b. TRAC's Div design Analysis Study: No.

c. The Nov 97 DAWE. Yes.

25. Tested elsewhere. Yes.

At Ft Hood, TX., IOTE II, Dec 96. Based on an OPTEC briefing on the IOTE II results: "... OPTEC Position...support type classification standard, and support full rate production decision (allow PM to obligate resources)."

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12: Yes.

Prior years: \$16.3M for 162 systems; FY 98-03: \$31.9M for 319 FP 1 systems, \$24.6M for 245 FP 2 systems, \$11.9M for 119 FP 3 systems; EPP: \$11.4M for 114 FP 3 systems, \$15.7M for 156 FP 4 systems. Totals \$111.8M for 1115 systems.

[Note: on 14 Aug 97 this study team was advised that by the Office of the TRADOC Systems Manager (TSM), CSSCS that they would provide updated information to the above. However, higher priority efforts precluded such from happening.]

27. Planned BOIP (connectivity between FPs). Yes.

There will be connectivity between all four FPs. Per SME: (a) there is an Oct 94 approved BOIP of 19 CSSCS per Div for all 10 Divisions, (b) plans call for fielding CSSCS also to the 15 Enhanced Readiness BDEs, and (c) when CSSCS is fielded to a parent active duty unit, at that time CSSCS will also then be fielded to aligned US Army Reserve (USAR)/National Guard (NG) units.

28. Technical capabilities. Proven.  
At the Dec 96 IOTE II.

29. LIA's 15 elements of ILS assessment. Assessed.

[SME said that in a 14 Mar 97 briefing to the CSSCS Army Systems Acquisition Review Council (ASARC) Overarching Integrated Product Team it was discussed that: "... Risk Assessment. CSSCS implemented a comprehensive risk management process emphasizing threat, technology, design & engineering, and cost. Overall risk assessment is low to moderate." Also, this study team was able to determine that OPTEC did conduct an ILS review for the CSSCS. However, limited study time precluded any further attempts to acquire their assessment.]

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). Yes.  
First Digitized Div to be fielded CSSCS in FY 97/98.

b. In time for the First Digitized Corps (2006). Yes.  
First Digitized Div will receive CSSCS in FY 97/98.

c. During FY 07-10. Yes.  
CSSCS will be fielded until complete fielding ends in FY 08.

31. Overall Peacetime (Programmatic) risk. Green.

Basis: (a) On 5 Mar 97 the HQDA Assistant DCSOPS recommended that the ASARC approve Milestone III for CSSCS, (b) also, in a 14 Mar 97 briefing to the CSSCS ASARC Overarching Integrated Product Team, it was discussed that: "... Risk Assessment. CSSCS implemented a comprehensive risk management process emphasizing threat, technology, design & engineering, and cost. Overall risk assessment is low to moderate." CSSCS MIPS, 26 Feb 97, paragraph 6.0, page 16: "...the overall risk assessment for the current program is considered 'low.' However, the ABCs-compliant system rating can reach 'moderate' if emerging requirements exceed available funding," and (c) SME-MJ as based upon answers provided above.

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Medium

Per the CSSCS 26 Feb 97 MIPS: "...the CSSCS communications links may be susceptible to electronic and information warfare threats. The system is also vulnerable to potential software viruses and information threats. Per 13 Mar 97 HQDA DAMI-FIT memo: "...The CSSCS Systems Threat Assessment Report (STAR) is approved for a period of one year." Also, in a 14 Mar 97 briefing to the CSSCS ASARC Overarching Integrated Product Team, it was discussed that: "... Risk Assessment. CSSCS implemented a comprehensive risk management process emphasizing



threat, technology, design & engineering, and cost. Overall risk assessment is low to moderate," per CASCOM briefing on TRADOC Position for CSSCS: "... Specific CSSCS 'classified' threat conditions are identified in the STAR. CSSCS will not experience total mission degradation as a result of the identified threat."

33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation. Unknown.  
WIN wartime degradation/vulnerability is "Unknown" at this time.

34. Wartime backup (BU) system. Use of other available CSSCS systems (or other available info communication networks, to include sneaker nets) to pass CSS C2 info. Worst case BU would be reversion to manual procedures. Use of any of these BUs would degrade the efficiencies/effectiveness intended for CSSCS. It should be noted that CSSCS has a built in structure that allows for transferring from on computer to another. CSSCS has a full-up Continuous Operations Plan (CONUP).

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available.  
N/A.  
It is felt that we can always revert to at least a manual information processing system if required.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available.  
Medium.  
Timeliness and accuracy of CSS C2 info would be adversely affected.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Medium.  
Some units would be on a manual CSS C2 system while others would have CSSCS. However, plans call for total FP fielding for CSSCS.

38. Other adverse wartime impacts (e.g., scenario dependent). None.

39. Overall wartime risk associated with employment of this given CSS E/I. Green.  
Basis: SME-Military Judgment as well as information contained in all the aforementioned documents/reports/briefings.

40. Overall risk (considering both programmatic and wartime risks). Green.

41. Ordinal ranking of this CSS E/I by the CSS DCDs.

42. Cardinal ranking of this CSS E/I by the CSS DCDs.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities.

44. Remarks. None

45. Data Sources. CPT Laszlo and Ms. Laird, Office of the TSM for CSSCS, FT Lee, DSN: 687-2867. CASCOM Sep 96 CSSMMP and related May 97 updates.

1. Title. Contact Maintenance Truck (CMT)

2. Designation. FXXI CSS Enabler-ORC.

The CMT offsets a heretofore unresourced requirement to be able to perform contact maintenance with the supported force.

a. Description: A self contained, multicapable light repair system consisting of an ensemble of enhanced hand and power tools, TMDE, welding and cutting equipment, and air compressor in an enclosure, mounted on an heavy HMMWV (M1097) vehicle chassis.

b. Characteristics: CMT-Heavy (CMT-H) will replace older obsolete contact trucks utilizing the M880 and CUCV chassis and meets requirements for both Ordnance and Engineer on-site repair missions. Specific components: Secure enclosure with easy access to tool cabinets and equipment; highly durable, state of the art hand tools; enhanced electric power tools; ARC & MIG welding and gas (oxy-propylene) brazing and cutting; utility air compressor; test and diagnostic equipment; high mobility standard chassis; increased payload for spares, special tools, and individual military gear.

c. Requirement/Need/Mission: The CMT-H provides a vast improvement over the current contact trucks. The CMT-H is a self contained multicapable repair system which will perform on-site organizational to direct support level repair for wheel vehicles and equipment. It has high mobility to maintain continuous support of maneuvering forces. It has enhanced tools and equipment on-board tailored to support new and older equipment. It can carry needed parts/spares, special tools, and equipment which had previously overloaded the CUCV and M880 chassis. The design of the enclosure and components has been thoroughly reviewed by soldiers and technical experts for maximum efficiency, capability, safety, and accessibility (human engineering). The CMT-H requirement has combined missions for the repair and support of Ordnance and Engineer systems. The CMT-H was type-classified standard, limited production, in September pending final resolution of components. The CMT will be produced at Rock Island, IL (Army Armament and Chemical Acquisition and Logistics Activity (ACALA).

3. DTLOMS Area.

a. Primary: Materiel.

b. Secondary: None.

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Materiel.

5. CSS BOS Function.

a. Primary: Fix.

b. Secondary: None.

6. FXXI Priority. High  
Based on SME-MJ

7. CASCOT's 4 Sep 96 CSS Materiel Master Plan Priority. High.

[The CMT was prioritized as # 12 out of 51 items. Also, the CMT was prioritized as # 5 out of a possible 21 Ordnance items.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Briefed  
The briefing charts (a) indicated that the CMT was rated "Green" for money in the POM, or programmed to be in the POM for the First Division Equivalent (by FY 2000 or before), and (b) recommended that an additional \$3.7M be funded by FY 03 to prevent break in production. Current funding with plus-ups will buy FP 1 requirements.

9. The 1996 US Army Modernization Plan. Reviewed.

[The Maintenance Equipment Program, page 1-15 of this Plan, discusses the CMT. The Maintenance Equipment Program was rated "Red" for the near-term (FY 96-98), "Amber" for the mid-term (FY 99-01) and "Red" for the far-term (FY 02-11) due to reduced procurements.]

10. Prerequisite(s).

a. FXXI E/Is. Unknown.

[The Sensor Artificial Intelligence Communications Interactive Maintenance Systems (SACIMS) CEFA SME indicated that the CMT must have FBCB2-capable radios onboard for his SACIMS to work as designed. However, the CMT SME indicated that he could see no "prerequisites" for the CMT to perform its basic functions of contact maintenance. This distinction of requiring a "prerequisite" or not hinges upon the criticality of FBCB2 capable radios for the CMT to be able to perform its fundamental mission. Until this is resolved, this study team elected to assign an "Unknown."]

b. Other prerequisites. None.

11. Overall risk status of

a. Prerequisite E/Is. Unknown

[Refer to paragraph 10a above.]

b. Other prerequisites. N/A.

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. Unknown

[Refer to paragraph 10a above.]

b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? None.

[SME responded that "The CMT system is needed to support the FXXI maintenance concept and mitigate the adverse effects of the loss of maintainers through the FXXI Division Redesign." While the "FXXI maintenance concept" by itself is not designated as a FXXI enabler/initiative, the overall synergistic benefit expected from this concept relies on successfully fielding many different FXXI maintenance enablers/initiatives.]

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

[SME responded that "The prime mover (CUCV) for the current system lacks the required mobility to provide on site repair to unit equipment. The current module has an inferior equipment configuration when compared to the CMT. Combat power of supported units will be adversely affected. Loss of maintainers through the FXXI Division Redesign will overwhelm the current fix forward maintenance platforms and their operators. Our current maintenance force structure is designed to support the pre Army Of Excellence (AOE). The CMT when combined with other planned FXXI maintenance enablers/initiatives will enable us to leap ahead to a position where we can support AOE and FXXI. The real time information flow which results from current information dominance initiatives will elevate the expectations of commanders for Combat, CS and CSS assets to respond in near real time. If the CUCV remains the center of gravity for light forward maintenance operations in a digitized Army, our future combat systems will be forced to rely on an outdated maintenance platform." This response is aimed at the FXXI maintenance concept; however, as stated above the FXXI maintenance concept is not a FXXI enabler/initiative. Therefore, this study team elected to assign a "N/A."]

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? Specify.  
Fielding the CMT will greatly benefit any system requiring light forward maintenance repair.

16. Supporting analytical studies. None

[No COEAs/AOAs could be located by the SME. He indicated that it is possible that no COEA was required since the CMT is an ACAT III system. He cited the 20 May 93 message issued by the then TRADOC CDR, subject: Cost and Operational Effectiveness Analysis. This message established that "COEA guidance should state that in those instances when (a) COEA is required for ACAT III/IV systems, it will only include: A. a description of program costs as routinely prepared.... B. a single page explanation of the benefits to be derived from the program, not a summary of expanded effectiveness analysis done and reported elsewhere. This guidance will prevail unless HQDA directs otherwise for special cases..."]

17. Changes in manpower requirements caused by fielding this given CSS E/I. None.  
The crew size of the planned CMT will be the same as the current CUCV.

Plans call for a one-for-one replacement of the current CUCV.

18. Related changes in CSS efficiency. Increase.

The CMT will increase efficiency of contact maintenance missions through the replacement of the current CUCV prime mover and the maintenance shelter. The new prime mover is a HMMWV. The shelter contains the modern high quality hand and power tools. The tools are stored in foam cut out drawers that facilitate inventory and accountability of onboard tools. The system also has welding capability.

19. Related changes in CSS effectiveness. Increase.

The CMT system will be able to keep pace with supported units, thus expanding the operational area where contact maintenance missions can be performed. The CMT will reduce the turn around time of contact maintenance repairs. Supported units will perform more effectively with fewer systems down for shorter periods of time.

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself). None.

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Developed.

The CMT operational Concept was developed IAW the Operational Mode Summary/Mission profile (OMS/MP) which is part of the original CMT Required Operational Capability (ROC) document. However, it is likely that this needs updating to reflect new FXXI maintenance procedures.

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. Yes.

All supporting documentation was approved in the early 1990's, and subsequently updated or revised in the mid-1990's.

b. ORD. Yes.

c. BOIP. Yes.

BOIP/TOTAL REQUIREMENT: The CMT LIN (Z65205) and BOIP (O042AA) for the CMT-H enclosure, tools, equipment and accessories is separate from the HMMWV LIN. The CMT-H will replace various old LINs T10138, S30982 and S30914. Estimated total TOE requirement is Total requirements: 3,372. (FPI - 622; FP II - 398; FP III - 1,164; FP IV - 1,188)

23 CSS E/I training in TRADOC schools. No.

24. Examined in

a. TF XXI AWE (Mar 97). No.

The CMT system did participate but was not evaluated.

b. TRAC's Div Design Analysis Study. No.

c. The Nov 97 DAWE. No.

25. Tested elsewhere. Yes.

TECOM conducted a CEP test in 1991 at Aberdeen Proving Grounds, MD. The SME had no test results. Also, the CMT was used in Operation Joint Endeavor, but no documented lessons learned are available. The SME did receive positive verbal feedback from soldiers using the CMT.

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. Yes.

Prior Years: \$3.4M for 62 FP 1 systems. FY 98-03: \$29.6M for 538 FP 1 systems. EPP: \$75.8M for 22 FP 1 systems, for 398 FP 2 systems, for 1164 FP 3 systems and for 179 FP 4 systems. This funds 2363 (70%) of the 3372 estimated requirements. About 30% (1009) of the CMT requirements is unfunded.

27. Planned BOIP (connectivity between FPs). Yes.

Plans call for fielding the CMT to all four FPs.

28. Technical capabilities. Proven.

Per the CASCOM SME: "The technical capabilities of the CMT are proven since the CMT has already been fielded to units."

29. LIA's 15 elements of ILS assessment. Unknown.

Initially fielded CMT were "Green", re-buy sets are yet to be rated.

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). Yes.

MILESTONES: Contract Award 4Q95 95 by ACALA; First Unit Equipped (FUE) 3Q96.

b. In time for the First Digitized Corps (2006). Yes.

c. During FY 07-10. Yes.

[SME responded "Unknown. CMT will be fielded in Department of the Army Master Priority List (DAMPL) sequence IAW HQDA ODCSOPS guidance." However, based on information in paragraph 26 above concerning EPP (FY 04-12) programmed fielding, this study team assigned a "Yes."]

31. Overall Peacetime (Programmatic) risk. Green.

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.

33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation. Unknown

[Refer to paragraph 10a above.]

34. Wartime backup (BU) system. A BU system could very well be the use of a CMT from a sister/ adjacent maintenance unit, or perhaps an available Forward Repair System- heavy (FRS-H).

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available.  
N/A.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available.  
Medium.

Use of a BU system would degrade the sister unit's own maintenance capability.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Medium.  
Most prevalent impacts would be lack of readiness equity in deployed units. Potential loss of synchronized maintenance effort if mixed units (FP 1, FP 2) are deployed together. However, plans call for fielding the CMT to all four FPs.

[Such would adversely affect battlefield attainment of the synergistic benefits planned from employing the new FXXI maintenance concept.]

38. Other adverse wartime impacts (e.g., scenario dependent). None.

39. Overall wartime risk associated with employment of this CSS E/I. Green.

40. Overall risk (considering both programmatic and wartime risks). Green.

41. Ordinal ranking of this CSS E/I by the CSS DCDs.

42. Cardinal ranking of this CSS E/I by the CSS DCDs.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSSMMP priorities.

44. Remarks. None

45. Data Sources. CPT K.C. Simpkins, CASCOM (DCD-Ord Dir), DSN: 687-0497). CASCOM Sep 97 CSSMMP and related May 97 updates.

1. Title. Container Handling Unit (CHU).

2. Designation. FXXI CSS Initiative.

a. Description: The Container Handling Unit system allows for the interface between the Palletized Load System (PLS) distribution platform and ISO conforming containers without the use of a flatrack.

b. Characteristics:

- Ability to cater for ISO height variants.
- One man operation.
- Ability to retain full flatrack interoperability with absolute minimum reconfiguration.
- Ability to cater for vertical and horizontal misalignment of the container.
- Minimum equipment weight-maximized prime mover payload potential.
- Cost effective design.

c. Mission: CHU will increase the flexibility of the PLS. It will expand the PLS battlefield uses. The system will reduce transshipping cargo times when handling ISO compatible shelter/containers when operating in the Corps and Echelon above Corps area of operations.

d. Milestones: Source Selection Board currently underway. Contract award is scheduled for 28 Jul 97. FUE will occur in the 126th Trans Co and the 8th Ammo Co (General Support (GS)) at Ft. Bragg, NC. in Apr 98.

3. DTLOMS Area.

a. Primary: Materiel.

b. Secondary: None.

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Modernization.

5. CSS BOS Function.

a. Primary: Distribute.

b. Secondary: None.

6. FXXI Priority. Medium.

The CHU is CASCOM (DCD-Trans Dir) priority #4 out of 7 FXXI entries.

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. None.

[The CHU was not listed in this Plan.]



8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed.

9. The 1996 US Army Modernization Plan. Not Reviewed.

10. Prerequisite(s).

a. FXXI E/Is. None.

b. Other prerequisites. CSS.

The CHU requires a PLS vehicle, which by itself is not a CASCOS declared FXXI CSS initiative.

11. Overall risk status of

a. Prerequisite E/Is. N/A.

b. Other prerequisites. Low.

PLS trucks are being fielded to Corps units. (However, the PLS required for the "PLS DISCOM XXI" FXXI initiative are not funded.)

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. N/A

b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? None.

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? Specify.

The PLS DISCOM XXI initiative could benefit by CHU fielding.

16. Supporting analytical studies. None.

17. Changes in manpower requirements caused by fielding this given CSS E/I. None.

CHU will reduce dependencies on Materiel Handling Equipment (MHE) in the corps and forward to containers. No Supply Support Activity (SSA) is being revised to reduce MHE or operators based on the CHU.

18. Related changes in CSS efficiency. Increase.

CHU will allow the PLS to pickup/drop 20' ISO containers without use of the M1077 flatrack (based on informal user evaluations).

19. Related changes in CSS effectiveness. Increase.

CHU will reinforce doctrine for container operations and will enhance throughput operations of containers.

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself). None.

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Developed.

Same concept as for PLS and for Container Roll In/Roll Out Platform (CROP). Approved container doctrine is in FM 55-80.

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. Yes.

Using the approved PLS MNS.

b. ORD. Yes,

Using the PLS ORD- to be updated Sep 97.

c. BOIP. Yes.

#TO44AE, Jul 94. One CHU per every PLS in a Corps Medium Truck Company. Three per Direct Support (DS) Ammo Company. Nine per GS Ammo Company.

23. CSS E/I training in TRADOC schools. No.

Not yet. PM-HTV is developing doctrinal publications. CASCOT and PM are developing TTPs. PM-HTV is developing training support packages.

24. Examined in

a. TF XXI AWE (Mar 97). No.

b. TRAC's Div Design Analysis Study. No.

c. The Nov 97 DAWE. No.

25. Tested elsewhere. Yes.

Only informal User Evaluations of prototypes and some technical testing performed by the PM.

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. Yes.

FY 98: \$1.02M; FY 99: \$.8M; FY 00: \$.4M; FY 01-03: none. FP 1: 225 funded. FP 2: 279 funded/22 unfunded. FP 3: 341 unfunded. FP 4: 899 unfunded. Total of \$2.22M funded for 504 systems. \$10.3M unfunded for 1262 systems. Unit price is \$20 plus 5K for installation. Prototype safety release received on 9 Oct 96. Eight prototypes are built. Prototypes are presently located at: 1-at Ft. Bragg (126th Trans Co), 1-at Ft Carson (32d Trans Co), 3-at Ft. Stewart (396th Trans Co & 87th COSCOM), 1-at Ft. Polk (NTC rotation), and 2-at Yuma Proving Ground.

27. Planned BOIP (connectivity between FPs). Yes.  
Plans call for fielding the CHU to all four FPs.

28. Technical capabilities. Proven.  
Yes through informal user evaluations of the eight existing prototypes.  
Formal testing will occur in 1st quarter FY 987 at Yuma Proving Grounds.

29. LIA's 15 elements of ILS assessment. Unknown.

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). Yes.  
CHU is to be fielded to the First Digitized division during Apr 98-Dec 00.

b. In time for the First Digitized Corps (2006). Unknown.

c. During FY 07-10. Unknown.

31. Overall Peacetime (Programmatic) risk. Amber.  
Due to lack of funds.

[This study team also thinks that the lack of formal technical testing contributes to an "Amber" risk rating.]

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.

33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation. N/A.

34. Wartime backup (BU) system. BU system would be MHE and PLS equipped with the M1 or M1077 flatrack. Or EAC PLS units would haul ISO containers all the way down to the Division.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. N/A.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. Medium.  
We would not be able to meet throughput capacity of containers as based on FM 55-80, nor the new Division XXI requirements for a nonlinear battlefield.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Medium.  
Would create adverse imbalance of throughput capacity between FP 1 units with the CHU and units without CHU.

38. Other adverse wartime impacts (e.g., scenario dependent). None.

39. Overall wartime risk associated with employment of this CSS E/I. Green.

40. Overall risk (considering both programmatic and wartime risks).

Amber.

Due to lack of sufficient funds and formal testing.

41. Ordinal ranking of this CSS E/I by the CSS DCDs.

42. Cardinal ranking of this CSS E/I by the CSS DCDs.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities. N/A.

44. Remarks. None.

45. Data Sources. MAJ Wehrli, CASCOM (DCD-Trans Dir, DSN: 687-2948.

1. Title. Container Roll In/Roll Out Platform (CROP).

2. Designation. FXXI CSS Initiative.

a. Description: The CROP is a cargo carrying platform suitable for repeated use throughout the Palletized Load System (PLS) vehicle mission profile. The CROP shall be carried loaded, without dunnage, in any International Organization for Standardization (IOS) 1C or 1CC dry cargo container that has an internal width and door opening width of at least 92 inches and an internal length of 231 inches. The CROP shall be loaded with ammunition, all classes of supply and miscellaneous unit equipment.

b. Characteristics:

- Width 91.5 in.
- Deck height 10.5 in.
- Height 64 in. (bail bar extended).
- Length 117 in.
- Weight 3250(desired).
- Maximum Payload Weight: 36, 250 lbs.

c. Mission: CROP will transport ammunition through the Maneuver Oriented Ammunition Distribution System (MOADS)/Palletized Load System. It will expand the PLS battlefield uses. CROP will reduce transshipping cargo times and eliminate blocking and bracing efforts at the origin point of loading as well as the off loading destination point. Future missions will require CROP to transport all classes of supply all the way through to the Brigade rear area.

d. Milestones: TRAC-LEE flatrack requirements study approval by DCSOPS scheduled in Jun 97. Study will determine total U.S. Army flatrack requirement for the next 10-20 years. Contract award scheduled for 30 Jun 97. FUE is scheduled at Fort Eustis 1 Jul 98.

3. DTLOMS Area.

a. Primary: Materiel.

b. Secondary: None.

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Modernization.

5. CSS BOS Function.

a. Primary: Distribute.

b. Secondary: None.

6. FXXI Priority. Medium.

CROP is prioritized #3 out of 7 CASCOS FXXI entries.

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. None.

[CROP was not listed in this Plan.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed.

9. The 1996 US Army Modernization Plan. Not Reviewed.

10. Prerequisite(s).

a. FXXI E/Is. None.

b. Other prerequisites. CSS.

CROP must be extracted from a container using either PLS, MHE or the Heavy Expanded Mobility Tactical truck (HEMTT)- Load Handling System (LHS).

[Note: the HEMTT-LHS is a FXXI CSS initiative. However, this study team did not list it as a "prerequisite" since if the HEMTT-LHS was not fielded, then CROP could still be employed using existing MHE or PLS. Later on the SME indicated that "MHE" is the only true "prerequisite" for CROP.]

11. Overall risk status of

a. Prerequisite E/Is. N/A.

b. Other prerequisites. N/A.

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. N/A.

b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function?  
Unknown.

[The SME stated that the FXXI CSS initiatives of PLS Division Support Command XXI (DISCOM XXI) and HEMTT-LHS "require" the CROP. However, this study team thinks that these two FXXI initiatives could "benefit" from CROP fielding, rather than actually "require" the CROP in order to function. It is the opinion of this study team that if CROP procurements were stopped for any reason, PLS could still have a role in the DISCOM as well as the HEMTT-LHS in the brigade, albeit both would not realize maximum effectiveness and contributions to BD. Also, a non-CROP dependent use of the HEMTT-LHS is cited in paragraph 2d of the HEMTT-LHS CEFA. Until this is resolved, this study team elected to assign an "Unknown."]

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. Unknown.

[Refer to discussion in paragraph 13 above. Until this is resolved, this study team assigned an "Unknown."]

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? Unknown.

[Refer to paragraph 13 above. It is possible that employment of PLS in the DISCOM XXI and employment of the HEMTT-LHS could "benefit" by CROP fielding rather than actually "require" the CROP. Until this is resolved, this study team elected to assign an "Unknown."]

16. Supporting analytical studies. Yes.

Study conducted by Hughes Aircraft Corp., Jan-Mar 97. It shows that stuffing 20' ISO containers using the CROP can be done 10 times faster and 20 times cheaper.

17. Changes in manpower requirements caused by fielding this given CSS E/I. Unknown. CROP could reduce the need for additional MHE if HEMTT-LHS and PLS are used to extract the CROP. (Source: ARL-sponsored Hughes study.)

18. Related changes in CSS efficiency. Increase.

CROP will reduce transship time to load and unload containers; eliminates need to strap down cargo extracted from container on another vehicle. CROP manhours are 20 times less than baseline hours for similar operations without the CROP. (Source: ARL-sponsored Hughes study.)

19. Related changes in CSS effectiveness. Increase.

Using CROP is 10 times faster than the conventional baseline procedures when stuffing a container. (Source: ARL-sponsored Hughes study.)

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself).  
Unknown.

[CROP could reduce the need for additional MHE if HEMTT-LHS and PLS are used to extract the CROP. (Source: ARL-sponsored Hughes study.)]

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Developed.

The bulk of CROP usage will be for moving CL V. Therefore, the plan is to use existing AOE MOADS concept for CL V movement until Battlefield Distribution concept is approved. The operational concept for CROP movement of other classes of supply is pending.

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. N/A.

MNS not required. PLS ROC already includes flatrack employment.

b. ORD. No.

In Sep 97 CASCOM will do an addendum to the current PLS ORD adding the CROP model.

c. BOIP. No.

BOIP: To-Be-Determined. LIN #: TBD. Quantity: TBD.

23. CSS E/I training in TRADOC schools. No.  
Not yet.

24. Examined in

a. TF XXI AWE (Mar 97). No.

b. TRAC's Div Design Analysis Study. No.

c. The Nov 97 DAWE. No.

25. Tested elsewhere. Unknown.

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. Yes. 85,000 CROP are required; 9800 have been bought with FY 97 monies, leaving 75,700 to be purchased for all classes of supply less CL III and water. FY 98: \$7.08M; FY 99: \$7.7M; FY 00: \$16.2M; FY 01: \$48.7M; FY 02: \$24.2M; FY 03: \$24.2 M. EPP: FY 04-12: \$30M each year, totaling \$270M. PROGRAM STATUS: Unit price is about \$6,000.

Note: pending HQDA ODCSOPS approval of TRAC-Lee's flatrack study. Then FY 98-03/EPP monies for standard flatracks will be shifted to CROP procurements.

27. Planned BOIP (connectivity between FPs). Yes  
Plans call for fielding CROP to all four FPs.

28. Technical capabilities. Unproven.

Not proven, but will be tested 1st quarter FY 98 at Aberdeen Proving Grounds, MD. Further testing will occur at Yuma Proving Grounds and at White Sand Missile range, NM. ARL has three prototypes which have met the purchase description payload requirement. (Maximum Payload Weight: 36, 250 lbs.)

29. LIA's 15 elements of ILS assessment. Not Assessed.  
Not yet.

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). Unknown.

[SME indicated that the first unit fielded with the CROP will be Jul 98.]



- b. In time for the First Digitized Corps (2006). Unknown.
- c. During FY 07-10. Unknown.
- 31. Overall Peacetime (Programmatic) risk. Amber.  
Lack of funding pending HQDA ODCSOPS approval of TRAC-LEE flatrack study.  
[This study team also thinks that the lack of testing also contributes to an "Amber" risk rating.]
- 32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.
- 33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation. N/A.
- 34. Wartime backup (BU) system. BU system would be conventional loading/unloading procedures.
- 35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. N/A.
- 36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. Medium. Conventional loading/unloading procedures would be time consuming and expensive. Such would therefore impact on the maneuver commander's options.
- 37. Adverse wartime impacts due to limited fielding of this given CSS E/I. None. CROP will be pooled centrally to be used by all units operating in the theater.
- 38. Other adverse wartime impacts (e.g., scenario dependent). None.
- 39. Overall wartime risk associated with employment of this CSS E/I. Green.
- 40. Overall risk (considering both programmatic and wartime risks). Amber.  
Lack of funding pending HQDA ODCSOPS approval of TRAC-LEE flatrack study, and lack of sufficient testing.
- 41. Ordinal ranking of this CSS E/I by the CSS DCDs.
- 42. Cardinal ranking of this CSS E/I by the CSS DCDs.
- 43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities. N/A. CROP was not listed in this Plan.
- 44. Remarks. None.
- 45. Data Sources. MAJ Wehrli, CASCOM (DCD-Trans Dir), DSN: 687-2948.

1. Title. Containerized Kitchen (CK)

2. Designation. FXXI CSS Initiative.

a. Description: The CK is a highly mobile field kitchen capable of providing up to 550 hot, prepared meals three times daily. The CK will be towed by a 5 ton truck or larger.

b. Characteristics: The CK will utilize existing and emerging Army Field Feeding Equipment and offer the capability to prepare any of the current or emerging operational rations (A, B, H&S). The CK will:

- accommodate cross country travel
- possess multi-fuel burners for appliances
- have built in power and refrigeration
- have expandable side-walls for added prep, serving, cooking, staging and clean-up space
- possess environmental control capability
- possess lighting and water capability
- be capable of truck, trailer, PLS, rail, and airlift transportation

c. Requirement/Need/Mission: The Mobile Kitchen Trailer (MKT) was originally designed as an interim solution to the Army's field feeding needs of the Army after the Vietnam War. Some 20 years later, it is still the Army's source of cook prepared meals in the field. The fleet is aged and has moved beyond any ability to be modified for efficient operations as we move toward Force XXI. The MKT has limited space for cooks and its flexibility in preparing meals is even more limited. The environment that the MKT offers for preparing meals versus the environments offered for the same mission by the other services is not conducive to providing the best quality meals to soldiers in the field. These deficiencies and differences were forced to the forefront during Operations Desert Shield/Storm. The CSA directed vast improvements in this area. One of the most significant improvements is the development of the CK which will double the current capacity of the MKT, allowing a 2 for 1 exchange and offer a more resource efficient (fuel, manpower, time) field kitchen.

d. MILESTONES: First Unit Equipped, FY 00.

3. DTLOMS Area.

- a. Primary: Materiel.
- b. Secondary: None.

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Modernization.

5. CSS BOS Function.

- a. Primary: Man.

b. Secondary: None.

6. FXXI Priority. Medium.

[Based on SME's subjective prioritization.]

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. Medium.

[The CK was prioritized # 32 out of 51 items. Also, it was prioritized #15 out of 24 Quartermaster items.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed.

9. The 1996 US Army Modernization Plan. Reviewed.

[On page I-9 in the Sustain The Force section, the CK was discussed. "The Army Field Feeding System-Future consists of a combination of new and currently fielded equipment... it includes the Mobile Kitchen Trailer, Sanitation Center, Kitchen Company Level Field Feeding-Enhanced, High Mobility Multi-Purpose Wheeled Vehicle, and High Mobility Trailer. Mobile Kitchen Trailers are currently fielded, and will be replaced on a 1 for 2 basis in FP 1 units by the Containerized Kitchen, now in development.... This program (Sustain The Force) is rated "Amber for near-, mid-, and far-terms (FY 96-11). Funding shortfalls have delayed the research and development of the Laundry and Dry Cleaning System and soft shelter programs. Mid-and far-term funding is not sufficient to carry out planned field and food service equipment and soft shelter modernization program."]

10. Prerequisite(s).

a. FXXI E/Is. None.

b. Other prerequisites. None.

11. Overall risk status of

a. Prerequisite E/Is. N/A.

b. Other prerequisites. N/A.

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. N/A.

b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? None.

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? None.

16. Supporting analytical studies. Yes.

No COEA/AA was done on the CK. A Life Cycle Cost Analysis of different alternatives was performed in Nov 93 by a contractor for Natick Labs. This analysis was approved by the Natick CDR (the Milestone Decision Authority).

17. Changes in manpower requirements caused by fielding this given CSS E/I. None.

One CK will employ the same number of cooks as presently found in two MKTs.

18. Related changes in CSS efficiency. Increase.

The CK will feed 550 soldiers at one time compared to 250 for the current MKT. The CK will:

- accommodate cross country travel
- possess multi-fuel burners for appliances
- have built in power and refrigeration
- have expandable side-walls for added prep, serving, cooking, staging and clean-up space
- possess environmental control capability
- possess lighting and water capability
- be capable of truck, trailer, PLS, rail, and airlift transportation

19. Related changes in CSS effectiveness. Increase.

The aforementioned list of CK efficiencies make it highly effective in accomplishing its overall mission to quickly feed large volumes of soldiers in any environment.

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself). None.  
The prime mover for the current MKT is a 2 1/2 ton truck which is scheduled to be upgraded to a FMTV 5 ton truck. Therefore, there will be no additional organic prime mover required specifically due to fielding the new CK.

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Developed.

The CK will use the same concept as developed and approved in 1990 for the 1990 Army Field Feeding System-Future.

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. Yes.  
Approved 12 Feb 93.

b. ORD. Yes.  
Approved 8 May 95.

c. BOIP. Yes.

Approved Nov 95. The CK is now part of the future TOEs for all units. BOIP/TOTAL REQUIREMENT: One CK (LIN TBD) per 2 MKTs (LIN L28351) with the following requirements: FPI-252; FPII- 242; FPIII-278; FPIV-323, Total Requirement-1,095. One CK will replace 2 MKTs. Most In and AR battalions now have 3 MKTs ,with one additional MKT (totaling four MKTs) as a backup. Each Company however will retain its Kitchen, Company Level-Field Feeding Enhanced System on a trailer pulled by a HMMWV.

23. CSS E/I training in TRADOC schools. No.  
Not yet.

24. Examined in

- a. TF XXI AWE (Mar 97). No.
- b. TRAC's Div Design Analysis Study. No.
- c. The Nov 97 DAWE. No.

25. Tested elsewhere. Yes.

The CK was used in the Fall of 1996 at FT Bragg after a hurricane hit there. However, this was not an actual official "test." The initial CK test (a Technical Test of Operational issues) was done by TECOM at Aberdeen Proving grounds, MD., in May 97. The test report was not released as of 3 Jun 97. This report will cover the RAM aspects of the CK. Also, the CK will undergo a "Customer Test" in Germany in Sep 97.

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. Yes.  
For FY 99-03: \$7.647M, \$7.454, \$7.527, \$6.054, and \$10.845M respectively. The EPP has programmed the following: \$10.890 for each year in the EPP (FY 04-12). Total FP 1-4 requirements are for 1195 CKs. FP 1 requires 252 CKs. The FY 99-03 funding will cover the fielding of 294. Thus, all of FP I and some of FP2 are budgeted. However, the remaining FP 2-4 requirements are unresourced. The shortfall is about \$80M. PROGRAM FUNDING: MDEP RJS201, SSN=M86400. The cost of one CK is presently estimated at \$98,000.

27. Planned BOIP (connectivity between FPs). Yes.  
Plans call for fielding the CK to all four FPs.

28. Technical capabilities. Proven.  
Many of the CK components are COTS items presently used in the civilian sector.

29. LIA's 15 elements of ILS assessment. Assessed.

[This study team was able to determine that OPTEC did conduct an ILS review for the CK. However, limited study time precluded any further attempts to acquire their assessment.]

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). Yes.  
FUE starts at Ft Bragg in FY 99. The 4th ID at Ft Hood is either 3rd or 4th on the HQDA DAMPL.  
Thus, the CK should be fielded to the 4th ID around FY 00.

b. In time for the First Digitized Corps (2006). Yes.  
Fielding will continue through FY 12.

c. During FY 07-10. Yes.

31. Overall Peacetime (Programmatic) risk. Green.

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.  
Threat is similar to that of the supported unit. CK RAM is expected to be very good given the CK components are COTS items.

33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation. N/A.

34. Wartime backup (BU) system. Each Infantry (IN) and Armor (AR) Company will retain its Kitchen, Company Level-Field Feeding Enhanced System on a trailer pulled by a HMMWV.  
This can serve as a BU, as can other CKs from sister units.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. N/A.  
It is expected that some form of BU system will be available in the event that a given CK becomes inoperative or is damaged.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. Low.  
It is expected that the impact would be negligible given that some form of field feeding BU system could be found nearby.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Low.  
Units not receiving the modern CK would still continue to use their MKTs. However, given adequate funding, plans call for fielding the CK to all four FPs.

38. Other adverse wartime impacts (e.g., scenario dependent). None.  
The CK is designed to operate in all climates and scenarios.

39. Overall wartime risk associated with employment of this CSS E/I. Green.

40. Overall risk (considering both programmatic and wartime risks). Green.

41. Ordinal ranking of this CSS E/I by the CSS DCDs.

42. Cardinal ranking of this CSS E/I by the CSS DCDs.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities.

44. Remarks. None

45. Data Sources. MAJ Savage, CASCOM (DCD-QM), DSN: 687-1834. CASCOM Sep 96 CSSMMP and related May 97 updates.

1. Title. Defense Finance Battlefield System (DFBS)

2. Designation. FXXI CSS Enabler-ORC.

[CEFA SME indicated that DFBS was an Enabler-ORC. However, in a 12 Aug 97 CASCOM FXXI Concept/MNS/ORD briefing to the CDR CASCOM, the DFBS was labeled as an "initiative." Until resolved, this study team elected to leave this as an "Enabler-ORC."

a. Description: DFBS is a deployable hardware/software platform which supports finance and resource management (RM) operations in peacetime and war.

The DFBS is the Finance Corps battlefield enabler. It offsets a required capability that was heretofore unresourced. The DFBS will provide finance units with the capability to collect, display, distribute and process essential finance and accounting information to include travel, local procurement, military pay, disbursement transactions and comptroller operations. It will be operated by finance and resource management personnel in garrison as a semi-fixed or fixed system and in the field as a mobile system with the equipment being capable of operating from different power sources.

Under the current system, deployed unit information handling is completely manual. Soldiers give their information to a support team that uses a courier to carry the information to the finance detachment (FD). The FD must also use a courier to carry the information through the Finance Battalion (FB) to the Finance Group (FG). The FG then uses the military postal service to transfer the documents out of theater to a designated processing site. After being received at the designated site, the information is manually entered into a computer and electronically transferred to the appropriate Defense Finance and Accounting Service (DFAS) center. This system is manually intensive and is not supported by the current finance TOE force structure. Past experience shows the number of transactions generated on the battlefield can range in the hundreds of thousands. Under the current manual system of processing transactions and using the mail system for transporting time sensitive information, it is impossible for finance units to provide timely and accurate service to battlefield units. This is a critical issue because it has a direct impact on morale, battlefield manpower, in-theater procurement actions and lost training time.

DFBS will provide financial information consistent with current doctrine and is consistent with the Army's digitization of the battlefield initiative. The DFBS will enhance these battlefield operations in the following manner:

(1) Timeliness/Accuracy. The DFBS will make time sensitive information rapidly available to all decision-making levels.

(2) Interoperability. The DFBS must interface with other battlefield automated systems via the area common user system, to include Tri-service Tactical Communication System (TRI-TAC), Mobile Subscriber Equipment (MSE) and the Defense Data Network (DDN).

(3) Mobility/Deployability. As a mobile system the DFBS enables finance units to support the efficient mobilization of all components while simultaneously meeting peacetime



requirements. Since the system is deployable, effective finance and resource management support is possible during deployments.

b. Characteristics: DFBS is a deployable computer system providing full finance and accounting support in the field equal to garrison. DFBS is a modular LAN configuration utilizing notebook computers as the work stations. The notebooks can operate with support teams away from the LAN. Upload/download support along with on-line capability is designed for a combination of local/mainframe processing and queries. Telecommunications will include MSE, MILNET, INMARSAT, Commercial, and Cellular. Initial system interfaces will be to local level CSS systems with mainframe updates. System functionality includes Accounts Payable/Vendor Services, Military/Civilian Pay, Disbursing, Accounting, Travel, and Enemy Prisoner of War Pay.

c. Requirement/Need/Mission: Deploying on the last 12 DoD deployments in 5 years, the U.S. Army Finance Corps has continued to be a critical asset for the successful mission accomplishment of the tactical commander. Finance has played a key role as a logistics multiplier in funding local procurements from Host Nation laborers and transportation to repair parts and food. Moreover, the Finance Corps provides support for Military and Civilian Pay, Travel, Disbursing, Accounting, and Enemy Prisoner of War Payment. Expectations by commanders and reporting requirements mandated by DoD and Congress require that field operated Finance and Accounting (F&A) support be similar to that provided at home station. The Joint Uniformed Lessons Learned (JULL) Remedial Action Program (RAP) reports for recent combat and contingency operations have identified deficiencies in providing timely and accurate finance support. Finance requires DFBS to correct these problems. A DFBS configuration can deploy with all TOE Finance Units [Finance Command (FC), Finance Group (FG), Finance Battalion (FB), and Finance Detachment(FD)] and Division through Theater RM sections.

### 3. DTLOMS Area.

a. Primary: Materiel.

b. Secondary: None.

### 4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Both.

Currently, deployed Finance personnel use manual procedures for processing financial transactions. DFBS will modernize current procedures (paper and pen) through the use of automated techniques and equipment.

### 5. CSS BOS Function.

a. Primary: Man.

b. Secondary: None.

### 6. FXXI Priority. High.

DFBS enables the Finance Corps to support FXXI in accordance with the doctrine outlined in FM 14-100.

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. None.

[DFBS was not included in this Plan.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed.

9. The 1996 US Army Modernization Plan. Not Reviewed.

10. Prerequisite(s).

a. FXXI E/Is. None.

[DFBS "needs" information from the MARC card to realize its (DFBS) full synergistic potential in a battlefield environment.]

b. Other prerequisites. None.

11. Overall risk status of

a. Prerequisite E/Is. N/A.

b. Other prerequisites. N/A.

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. N/A.

b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function?  
None.

However, DFBS is needed to run all current financial management software when in a deployed environment.

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? None.

16. Supporting analytical studies. Yes.

After Action reviews (AAR) from Operation Desert Storm (ODS) indicated that a partial loss of fiscal control occurred due to antiquated manual procedures. This resulted in the Army having to forgive approximately \$59M in soldier debt.

17. Changes in manpower requirements caused by fielding this given CSS E/I. None.

DFBS enables a responsive, modular, tailorable force structure as outlined in FM 14-100 that otherwise would not be possible.

18. Related changes in CSS efficiency. Increase.

As based on SME-MJ, the DFBS will enhance the battlefield operations in the following manner:

(a) Timeliness/Accuracy. The DFBS will make time sensitive information rapidly available to all decision-making levels.

(b) Interoperability. The DFBS must interface with other battlefield automated systems via the area common user system, to include TRI-TAC, MSE and the DDN. Consequently, these other battlefield systems will have access to current financial management information.

(c) Mobility/Deployability. As a mobile system the DFBS will enable finance units to support the efficient mobilization of all components while simultaneously meeting peacetime requirements. Since the system is deployable, effective finance and resource management support is possible during deployments.

19. Related changes in CSS effectiveness. Increase.

The DFBS will enable the financial management community to maintain fiscal controls, as based on SME-MJ.

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself). Increase.

[The SME responded that fielding of the DFBS will require an addition of 179 unbudgeted) HMMWVs if fielded to all Active, Guard and Reserve finance units. Further, in another input document he indicated that "...These trucks would be used to move finance unit equipment, but not limited to (the) DFBS."]

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Unknown.

[SME provided no information concerning the existence of an operational concept.]

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. Yes.

[A 12 Aug 97 CASCOM briefing on Concepts/MNS/ORD indicated that the DFBS MNS was approved Jan 94.]

b. ORD. Yes.

[Per SME's 18 Jun 97 telephone call to this study team: the DFBS has its own approved ORD. However, CASCOM has recently decided to combine the DFBS with the Integrated Combat Service Support System (ICS3) ORD which was approved by HQ TRADOC on 5 Feb 97.]

c. BOIP. No.

Not yet developed. But the BOIP requirement is as follows. One DFBS of the appropriate configuration per unit. Deployment will support all TOE Finance Units (both Active and Reserve Components). Current requirement based on TAA03 is: FP I-1 FG consisting of 6 FB with 18 FD, 1 Corps RM and 4 Div RM; FP II-2 FC and 8 FB with 24 FD, 2 Theater RM, 1 Corps RM and 4 Div RM; FP III-1 FC and 2 FG consisting of 9 FB with 19 FD, 2 Corps RM and 2 Div RM; FP IV-2 FG consisting of 17 FB with 60 FD.

23. CSS E/I training in TRADOC schools. No.

Not yet. However, the Finance School has the capability to train students on all software programs that will be resident on the DFBS. Since finance personnel use these systems while in garrison, the training impact of DFBS would be minimal.

24. Examined in

a. TF XXI AWE (Mar 97). No.

b. TRAC's Div Design Analysis Study. No.

c. The Nov 97 DAWE. No.

25. Tested elsewhere. Yes.

Tested in Operation Joint Endeavor (OJE) (Bosnia). Finance School personnel are currently (as of Mar 97) gathering DFBS performance data in conjunction with the Center for Army Lessons Learned (CALL).

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. No.

PROGRAM FUNDING: MDEP-TBD; Estimated Hardware Unit Cost-FC \$200K, FG \$140K, FB \$70K, FD \$70K, RM \$40K. Estimated extended Hardware Cost by FP and Total-FPI \$2.1M, FP II \$3.0M, FP III \$2.6M, FP IV \$5.7M, Total \$13.4M.

[SME indicated that the required 179 HMMWV are also not budgeted.]

27. Planned BOIP (connectivity between FP). Yes.

Plans call for fielding DFBS to all four FP.

28. Technical capabilities. Proven.

We have working prototypes.

29. LIA's 15 elements of ILS assessment. Unknown.

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). Unknown.  
Presently DFBS has no funds.

b. In time for the First Digitized Corps (2006). Unknown.  
Presently DFBS has no funds.

c. During FY 07-10. N/A.  
DFBS is not scheduled for fielding then. If DFBS is not fielded by FY 2006, then newer technology will be pursued.

31. Overall Peacetime (Programmatic) risk. Amber.  
Based on complete lack of funding. However, the technology is proven; the system has been used in OJE; and DFBS MNS and ORD are approved.

[Further, DFBS "needs" MARC to be able to realize its full potential in a wartime environment. The MARC CEFA assessment indicated MARC is "Amber" (lack of funds). Thus, it is possible we may field a DFBS with less capabilities than desired.]

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.  
Due to system redundancies, the greatest system threat is an Electro Magnetic Pulse (EMP) associated with an atomic explosion.

33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation. N/A.

34. Wartime backup (BU) system. Manual procedures will always be available as a BU system.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. N/A.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available.  
Medium.

[The SME responded "manual system-no ability to process transactions in a timely manner. Less control of funds." This study team therefore assigned a "Medium" impact.]

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Medium.

[The SME responded "Non-compatibility with FP 2 & 3 (sic) units would severely degrade their ability to perform assigned missions (financial management)." This study team therefore assigned a "Medium" impact.

38. Other adverse wartime impacts (e.g., scenario dependent). None.

39. Overall wartime risk associated with employment of this CSS E/I. Green.

40. Overall risk (considering both programmatic and wartime risks). Amber.  
Complete lack of funding.

41. Ordinal ranking of this CSS E/I by the CSS DCD.

42. Cardinal ranking of this CSS E/I by the CSS DCD.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities. N/A.

[DFBS was not listed in this Plan.]

44. Remarks. None

45. Data Sources. CPT Jeffrey Powell, US Army Finance School, DSN: 734-8616 or Commercial:  
(803) 751-8616.

1. Title. Digital Medical Record (DMR).

2. Designation. FXXI CSS Initiative.

The DMR will eliminate many existing manual-entry techniques in most tactical medical activities in units as well as support installations. The DMR will interface with host computer systems using bar code, magnetic strip ICCs and biometric identification. The DMR data collection devices will be operated by non-computer literate personnel to scan, prompt, process, store, retrieve, transfer, and transmit medical data and identify and track patients. Using the Multi-technology Automated Reader Card (MARC) technology, DMR represents the electronic capture of patient demographics, diagnosis and treatment as far forward and as close to the point of injury as possible and practical.

3. DTLOMS Area.

a. Primary: Materiel.

b. Secondary: Soldiers.

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Both.

The end state of this enable is to combine all relevant medical and social information of a patient into one complete record. This effort will require that the capture of all the patient's data be digitized to include all test procedures, the results, and clinical encounters from the time of injury through diagnosis and treatment

5. CSS BOS Function.

a. Primary: Man.

b. Secondary: None.

6. FXXI Priority. Unknown.

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. None.

[MARC and DMR were not listed in this plan.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Briefed.

[HQ TRADOC briefing charts indicated that for MARC an additional \$6.2M was requested by FY 00, an additional \$18.6M by FY 03, and an additional \$21M by FY 06. The chart reads: "... Basis for digitizing the PSS system. Funding to equip FP 1/2 in POM and FP3/4 in EPP. This author does not know if this recommended additional funding also included funds for the DMR sub-component of the MARC.]

9. The 1996 US Army Modernization Plan. Not Reviewed.

[The MARC and DMR were not discussed in this plan.]

10. Prerequisite(s).

a. FXXI E/Is CSS.

[DMR will be a medical application of the MARC card. Thus, DMR depends on the successful fielding of the MARC.]

b. Other prerequisites. None.

11. Overall risk status of

a. Prerequisite E/Is. Medium.

[Refer to the MARC CEFA assessment. MARC was assessed as Amber (Medium) due to the uncertainty of programmatic funding.]

b. Other prerequisites. N/A.

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. None.

b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? None.

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

[The AMEDDC&S SME indicated that MC4 "needs" the DMR, and then indicated that the adverse impact on Medical Communications for Combat Casualty Care (MC4) if DMR were not fielded was "None." This study team was advised that MC4 is a group of subordinate FXXI initiatives, each required for the MC4 "system" to realize its full synergism in providing medical situational awareness. The loss of any single initiative would have some detrimental effect on MC4, but not stop it completely from realizing its intended purpose.]

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? Specify.

[a. Through interface with the planned FBCB2-CSS Functionality, the MSAC module of the CSSCS will directly benefit from the information contained in the DMR. Also,



although, the PSSCS was not listed as a FXXI CSS Initiative/Enabler, it also is expected to benefit from information stored in the DMR.

b. Further, SME indicated that MC4 “needs” DMR-derived information in order to realize its (MC4) full synergistic capability and to provide the maximum in medical situational awareness.]

16. Supporting analytical studies. None.  
No analytical studies exist.

17. Changes in manpower requirements caused by fielding this given CSS E/I. None.  
No analytical studies exist on which to base this answer.

18. Related changes in CSS efficiency. Increase.  
Based on both Army and Joint testing of the MARC in the Pacific (25th ID) by PACOM and current testing of the MARC in EUCOM. During these tests medical data (e.g., shot records) were contained on the MARC card.

[The SME also indicated that there were other related tests to include the recent TF XXI, but he did not provide any further elaboration/test results. Specific examples of “efficiencies” relate to more timely/accurate processing of medical information.]

19. Related changes in CSS effectiveness. Increase.

[SME indicated that aforementioned tests also substantiate an anticipated increase in effectiveness.” Specific examples of such “effectiveness” relate to capturing information as close to the point of injury as possible, and increasing medical situational awareness due to the complete digitization of the soldier’s medical record.]

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself). Increase.  
The technology is not currently in place for capturing this information. There will be a requirement for new equipment from as far forward as the combat medic through Echelons Above Corps (EAC) medical units. At the point of injury we cannot put a notebook computer on a Combat Medic. He will need some small hand-held device to capture data that then will need to be updated into FBCB2-CSS Functionality/the DMR itself). This equipment may also be needed at such places as the Combat Support Hospital if they are not linked to the FBCB2-CSS Functionality.

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Not Developed.  
No operational concept has been developed for the medical aspect of the MARC card.

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. Yes

In May 97 the Joint SMART Card Technology was approved by the JROC.

[This was also briefed on 12 Aug 97 to CDR CASCOS that a Joint MNS SMART card was approved 29 May 97.]

b. ORD. No.

ORD for a Joint SMART Card is in draft.

c. BOIP. No.

Plans call for one MARC card per soldier. The BOIP for the MARC reader device is to-be-determined.

23. CSS E/I training in TRADOC schools. No.

Not yet.

24. Examined in

a. TF XXI AWE (Mar 97). Yes.

Results still in draft. Conducted by the AMEDD Board in conjunction with OPTEC.

[CASCOS 9 Jun 97 TF XXI briefing charts for BG Dayan (Israeli Army) only discussed the MC4, with no specific reference to the DMR.]

b. TRAC's Div Design Analysis Study. No.

c. The Nov 97 DAWE. Unknown.

25. Tested elsewhere. Yes.

Pacific Medical (PACMED Net (sic)-ongoing (with the 25ID and MARC). COBRA Gold- 1996 and 1997.

[SME did not provide any test results.]

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12.

Unknown.

[AMEDDC&S SME indicated "As part of the FY 99 \$10M allocated for MC4. Only for selected units in FP1." He also referred this study team to the MARC POM funds.

However, this study team does not know if MARC funding also includes (a) software development monies for the DMR, and (b) the extra equipment as cited in paragraph 20a

above. Further, refer to paragraph 26 of the MARC CEFA assessment. This study team rated MARC funding as "Unknown" and wrote: "... CASCOT indicated they had no information (funding) on this (MARC) matter. One AG School SME indicated that MARC is not funded in the POM/EPP, whereas another SME indicated that he was 99% sure of current POM funding for the MARC." Until this is resolved, this study team elects to assign an "Unknown."]

27. Planned BOIP (connectivity between FP). No  
Not determined yet.

[However, the MARC CEFA assessment indicated that: "If MARC is fielded, plans call for it to go to each active duty Army, Navy and Marine Corps personnel.]

28. Technical capabilities. Proven.

[SME referred to the past/ongoing test with the 25 ID. Refer to paragraph 25 of the MARC CEFA assessment: "... MARC was tested in Oct 94 with the 25ID. Also with the US Marines, Pacific (Aug 95) and with US Navy units in Jun 96. Test results were for the most part good. Recommended changes have been made to meet needs of each service (e.g., revamp some medical items)."

29. LIA's 15 elements of ILS assessment. Unknown.

30. Fielding schedule.

- a. In time for the First Digitized Div (Sep 2000). Unknown.
- b. In time for the First Digitized Corps (2006). Unknown.
- c. During FY 07-10. Unknown.

31. Overall Peacetime (Programmatic) risk. Amber.  
Lack of funds; lack of defined medical operational concept for this MARC application, possible increase in supporting ancillary equipment.

[SME also indicated that the DMR's programmatic risk had to be the same as that for the MARC. The MARC CEFA assessment rated this as "Amber" due to absence of firm information about funding. Also, this author does not know if MARC funding (if any) would likewise handle DMR software development.]

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.

[SME indicated that this response had to be the same as for the MARC. The MARC CEFA rated this as "Low."]

33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation. Low.

[The MARC card itself is considered to be a prerequisite for the DMR. The MARC CEFA rated the MARC as a "Low" likelihood for wartime degradation.]

34. Wartime backup (BU) system. A wartime BU system would be the "stubby pencil" and similar to any MSAC BU system.

[Refer to paragraph 34 of the MSAC CEFA assessment: "...The MSAC BU system would have to be a reversal to a manual collection of data by the Combat Medic and the Combat Lifesaver, and other time consuming 'stubby pencil' procedures..."]

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. N/A.

We always will have a "stubby pencil" BU system available.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. Medium.

Manual BU system would require manpower intensive efforts. Such would result in information which would not be as accurate or timely as that obtained from an automated system.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. N/A.

[Plans call for fielding the MARC system to all FPs. The SME, however, indicated that there would be "...Minimal impacts if only FP1 units were deployed. If a mix of FP1 and others are deployed, then the impact becomes greater due to the mixture of units performing manual processes with those performing automated processes."]

38. Other adverse wartime impacts (e.g., scenario dependent). None.

This initiative is supposed to support the combat health care system through all echelons of care no matter the type of conflict or operational scenario.

39. Overall wartime risk associated with employment of this CSS E/I. Green.

[SME indicated that the MARC CEFA rating should apply. Refer to the MARC CEFA; MARC was rated "Green."]

40. Overall risk (considering both programmatic and wartime risks). Amber.

[Lack of funds; lack of defined medical operational concept for this MARC application; dependence on the prerequisite MARC card which is also rated with an overall risk of "Amber."]

41. Ordinal ranking of this CSS E/I by the CSS DCD.
42. Cardinal ranking of this CSS E/I by the CSS DCS.
43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities. N/A. DMR was not listed in this Plan.
44. Remarks. None.
45. Data Sources. MAJ Windham, AMEDDC&S, DSN: 471-2433. Also, the SME cited the following sources: (a) TRADOC Pamphlet 525-66, (b) Theater Medical Information Program (TMIP) Capstone Requirements Document, (c) AMEDD Information Operations Concept, and (d) the MC4 white paper.

1. Title. Digital Source Collector (DSC)

2. Designation. FXXI CSS Enabler.

a. More accurately determine usage factors and component and equipment time-to-failure. Assist in fault determination reducing serviceable component and equipment replacement. System can focus maintenance trouble-shooting efforts thus reducing overall maintenance man-hours required.

b. The DSC will be a multifunction system installed in all Force Modernization Aircraft with the capability to simultaneously acquire, store and process aircraft structural, engine, drive train, electronic data, and voice interchanges. The DSC will include a crash survivable memory unit (CSMU) to support aircraft accident prevention and investigation. The data collected by the DSC will be used for maintenance, maintenance history, trending, aircraft system and subsystem monitoring, system safety related uses, and training. Collected data will also assist in aviation preventive maintenance, troubleshooting, recording flight data, and scheduling maintenance events. The Digital Source Collector is in the Aviation Mission Area and will reduce Operations and Support costs, improve force protection, accelerate the flow of information and improve maintainability. It responds to a need in the Horizontal Integration Mission Need Statement to reduce total workload through automated fault identification and prioritization, and to decrease administrative workload by reducing the time required for recording, processing and management.

[Until resolved, this study team had to assume that since USAAVNC&S designated the DSC as an "enabler," the planned "reduction in overall maintenance man-hours" will in fact equate to a reduction in overall maintenance "manpower requirements." Therefore, the DSC would then meet the CDR CASCOM's definition of a FXXI CSS "enabler."]

3. DTLOMS Area.

a. Primary: Materiel.

b. Secondary: Doctrine, Training, Soldiers.

[This initiative will also affect the "Soldiers" area since it will aid in preventing accidents, thereby saving lives.]

4. CSS E/I Type (Digitization/Modernization (D, M, Both). Both.

5. CSS BOS Function.

a. Primary: Fix.

[The DSC provides the Program Manager and manufacturer critical input on aircraft system performance. This input is critical for making improvements in the next generation aircraft systems. The DSC provides the battlefield and peace-time maintainer a "one-stop" quick and accurate source for armament, fuel, and maintenance-required status. This

information preserves flight crews and manpower.]

b. Secondary: None.

6. FXXI Priority. Unknown.

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. None.

[The DSC was not listed in this Plan.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed.

9. The 1996 US Army Modernization Plan. Not Reviewed.

[This study team could not locate any reference to the DSC in this Plan.]

10. Prerequisite(s).

a. FXXI E/Is. None.

b. Other prerequisites. None.

11. Overall risk status of

a. Prerequisite E/Is. N/A.

b. Other prerequisites. N/A.

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. N/A.

b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function?  
None.

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? Specify.  
Commanche, Improved Cargo Helicopter (ICH), AH-64D, OH-58D, UH-60A/L.

[The USAAVNC&S designated the Commanche as a FXXI CSS initiative due to its planned impacts on aviation maintenance requirements, and then latter withdrew such designation. This study team does not know if the Combined Arms Center (CAC) has designated any of the other aircraft systems mentioned above as either FXXI enablers or initiatives. Even

though these systems are not "FXXI initiatives," they are included here since they will benefit from DSC fielding. (Note: As the CEFA study methodology evolved over time, and as there were questions as to which Combat and CS systems had been declared "FXXI initiatives/enablers," some "non-FXXI" systems that might benefit from fielding the item under review were then included here, lest this information be lost.))

16. Supporting analytical studies. Yes.

Study	Date	Approved By/Briefed To
Digital Source Collector Demonstration, Verification, and Validation Study	Ongoing	Will be briefed to Program Manager, Aircrew Integration Systems
Infrastructure Definition for Digitally Enhanced Aviation Logistics	MAY 97	Commander, U.S. Army Aviation and Troop Command
Helicopter O&S Cost Reduction Resulting From Flight Critical	APR 97	Executive Director, Armament Research Development Center (ARDEC) U.S. Army Aviation and Troop Command
Qualification Test Plan for the Maintenance Data Recorder for Longbow Apache	APR 97	Project Manager, Longbow Apache Helicopter
Structural Usage Monitoring System for the MH-47E	FEB 97	Director, Army Aviation Technology Directorate
Vibration Management Enhancement Program	DEC 96	Project Manager, Utility Helicopters
Cost-Benefit Analysis for U.S. Navy and Marine Corps Helicopter Safety-of-Flight Systems	JAN 95	Assistant Deputy Under Secretary of the Navy (Safety and Survivability)
Cost Benefit Analysis for Flight Data Recorders on the UH-60A Black Hawk	FEB 90	Commander, U.S. Army Safety Center
Numerous Army Aircraft Accident Reports Recommending the Installation and Use of the Digital Source Collector on Army Aircraft		Commander, U.S. Army Safety Center
Numerous Studies by Flight Data Recorder Manufacturers		



(Boeing Defense & Space Group  
Helicopter Division, McDonnell  
Douglas, Base Ten Systems, Smiths  
Industries, Inc., Sundstrand Data  
Control, Inc.

17. Changes in manpower requirements caused by fielding this given CSS E/I. Decrease.  
Analytical studies conclude that the DSC will affect significant reductions in maintenance man-hour to flight hour requirements. Quantifiable estimates of these reductions are not available at this time. The DSC will have to be fielded before actual data for reductions can be realized.

18. Related changes in CSS efficiency. Increase.

The DSC will allow the maintainer to replace components and equipment just before or when they fail instead of when the manufacturer's time-change list directs him to replace the component or equipment. This will significantly extend the service-life of components and equipment, thus driving down costs and the requirement for long logistics tails.

19. Related changes in CSS effectiveness. Increase.

The DSC will provide on-board diagnostics and parameter exceedence recognition that will provide the flight crew with simultaneous advisories allowing the crew to take appropriate actions thus preserving equipment, aircraft systems and lives.

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself). None.

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Not Developed.

Not developed yet. The PM for Air Crew Integration Systems is working with Test and Experimentation Command (TEXCOM) (Ft Hood) to develop this concept.

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. Yes.

Horizontal Integration - MNS approval date is Unknown.

b. ORD. Yes.

Approved 30 Jun 96.

c. BOIP. No.

Not developed yet. However, when developed the BOIP will be one DSC per each of the Force Modernization Aircraft: OH-58D, AH-64A/D, UH-60A/L, CH-47D, RAH-66, RC-12, C-12.

23. CSS E/I training in TRADOC schools. Yes.

Some familiarization training is being conducted at the US Army Safety Officers Course at Ft. Rucker.

24. Examined in

- a. TF XXI AWE (Mar 97). No.
- b. TRAC's Div Design Analysis Study. No.
- c. The Nov 97 DAWE. No.

25. Tested elsewhere. Yes.

Versions of the DSC have been tested and proven in the civilian sector, and now are required by the Federal Aviation Agency (FAA) on all commercial aircraft. Also, the Task Force 160th, Special Operations Aircraft Regiment (SOAR), Ft. Campbell, KY., tested a Smith Industries DSC version in 1996. Test results indicated that the device performed as required. There also are ongoing tests at the United States Army Aviation Center, Ft. Rucker, AL., and with the US Navy.

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. No.

27. Planned BOIP (connectivity between FPs). Yes.  
Current plans call for fielding the DSC to all four FPs.

28. Technical capabilities. Proven.  
The DSC is COTS technology and is used today on commercial aircraft.

29. LIA's 15 elements of ILS assessment. Assessed.

[This study team was able to determine that OPTEC did conduct an ILS review for the DSC. However, limited study time precluded any further attempts to acquire their assessment.]

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). Unknown.  
The DSC can be fielded if the proposed fielding schedule is approved and funds are made available.

b. In time for the First Digitized Corps (2006). Unknown.  
The DSC can be fielded if the proposed fielding schedule is approved and funds are made available.

c. During FY 07-10. Unknown.  
The DSC can be fielded if the proposed fielding schedule is approved and funds are made available.

31. Overall Peacetime (Programmatic) risk. Amber.

The DSC is in the FY 98-03 POM as an Unresourced Requirement. It still needs funding.

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.

The likelihood of a RAM failure is estimated as "Low."

33. Likelihood of prerequisite C,CS or CSS E/I wartime degradation. N/A.

34. Wartime backup (BU) system. There will be no redundant DSC-like BU systems employed in aircraft.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. None. The aircraft fleet and Aviation Force performance will not be degraded.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. N/A.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Medium. Units which do not receive the DSC might not obtain the same OR rates as units having the DSC. However, plans call for fielding the DSC to all four FPs.

38. Other adverse wartime impacts (e.g., scenario dependent). None.

39. Overall wartime risk associated with employment of this CSS E/I. Green.

40. Overall risk (considering both programmatic and wartime risks). Amber. Complete lack of funding.

41. Ordinal ranking of this CSS E/I by the CSS DCDs.

42. Cardinal ranking of this CSS E/I by the CSS DCSs.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities. N/A.

[The DSC was not listed in this plan.]

44. Remarks. None

45. Data Sources. Mr. Max Thomas, US Army Aviation Center & School, Ft Rucker, DSN: 558-9298; Mr. Jody Creekmore, US Army Safety Center, Ft Rucker, DSN: 558-1178.

1. Title. Driver Minder- A Tactical Interactive Ground Equipment Repair Initiative (TIGER)

2. Designation. FXXI CSS Initiative

a. Description: Driver Minder is a generic term for a variety of competing COTS computer-based vehicle monitoring systems. An example of such a system is the Driver-Minder sold by Atkins Technologies, Gainesville, Florida. The Driver Minder is available in two versions: a touch-wand downloading configuration, or in a radio frequency (RF)-based configuration. We favor the latter (RF-based), because it can be placed and programmed to pass information automatically from the vehicle to a remote server.

b. Characteristics: Driver Minders usually are equipped to monitor several channels. Each channel reads electrical pulses emanating from its attached component. (Driver Minders can report on any system or component that generates an electrical pulse.) Typically, Driver Minders record mileage, oil pressure, fuel consumption, engine hours, and engine Revolutions Per Minute (RPM). Applying electrical switches or sensors permit them to record mechanical or hydraulic functions.

Vendors will program additional functions into the Driver Minder upon customer request-for a fee.

Driver Minders are used by several major trucking firms and distributors, such as Ryder Rentals, United Parcel Service, Yellow Freight Lines, and Miller Beer.

c. Requirements/Mission: By monitoring the driver, and designated operating indicators, Driver Minder offers an economical means of preventing catastrophic failures. Driver Minder identifies selected operator inputs, and component degradation in Army vehicles, generator sets, and other weapon systems. Data from the onboard system is downloaded to the central server, and deposited in appropriate databases. Algorithms in the server develop and report individual operator and vehicle conditions, as well as the readiness of the owning unit. This information enables logisticians to reduce drastically operations and support (O&S) costs. Driver Minders also can be employed to enhance driver and operator training.

Compared with SACIMS, which is designed to diagnose complex weapon systems, Driver Minder is simple, and inexpensive. Basically, Driver Minder monitors the performance of a vehicle and its operator from the moment of dispatch to turn in. Driver Minder is activated by the vehicle's ignition. A low power onboard radio transmits Driver Minder's data to an antenna at the motor pool or maintenance point exit as the host vehicle passes. Upon return to the motor pool Driver Minder dumps data accumulated since the vehicle's earlier dispatch. These data are collected and analyzed by the motor pool or maintenance unit server. Diagnostics algorithms alert to out-of-tolerance conditions. A mechanic equipped with a Pocket Unit Maintenance Aid (PUMA) is assigned a job order to make the directed repairs.

Because the Driver Minder monitors key functions of the vehicle while it is in operation, it is capable of detecting such out-of-tolerance behavior as over revving the engine, panic applications of the brakes, and fuel usage. Other functions can be programmed for additional monitoring. Knowing the operator's behavior permits implementation of accurate corrective actions and training. Such capabilities enable us to discern between wear, breakage and abuse.

At the server, Driver Minder is able to access Electronic Technical Manuals (ETM), and the Integrated Combat Service Support System (ICS3). It is therefore part of an integrated logistics system.

3. DTLOMS Area.

a. Primary: Materiel.

The acquisition and subsequent materiel development of this hardware, software, and its associated components will improve readiness in combat, combat support, and combat service support units.

b. Secondary: Doctrine.

[Driver Minder will contribute to automating materiel maintenance diagnostics and repair parts requisitioning in tactical units. This will result in fundamental changes to existing logistics practices.]

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Both.

5. CSS BOS Function.

a. Primary: Fix.

b. Secondary: Fuel, Distribute.

Driver Minder will indicate kilometers to empty and gallons or liters required. Also, Driver Minder will provide key information in order to initiate orders for repair parts.

6. FXXI Priority. Low.

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. Medium.

[Number 28 out of 51 (and number 13 out of 21 for Ordnance).]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed

9. The 1996 US Army Modernization Plan. Not Reviewed.

10. Prerequisite(s).

a. FXXI E/Is. None.

b. Other prerequisites. None.

11. Overall risk status of

a. Prerequisite E/Is. N/A.

b. Other prerequisites. N/A.

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. N/A.

b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function. None.

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? Specify.  
Multicapable Maintainer.

16. Supporting analytical studies. Unknown.

[Not known to SME. However, he stated that such information should be available from commercial studies.]

17. Changes in manpower requirements caused by fielding this given CSS E/I. Unknown.  
When completely fielded, Driver Minder will result in force structure equipment efficiencies, because it eliminates manual time consuming processes. Thus, Driver Minder may reduce requirements for maintenance personnel. Having it eliminates the need for a mechanic to have to draw, transport, and unlimber existing Test Measurement and Diagnostic Equipment (TMDE), then climbing onto the vehicle, opening hood, and hooking up the correct interconnecting cables or other instruments needed for diagnosing. Driver Minder also spares the mechanic from having to manually look up pertinent repair parts information, because this occurs in the motor pool office, or maintenance unit command post. Now the mechanic arrives at the job site not only with his work order, but with the correct tools and parts.

18. Related changes in CSS efficiency. Increase.

[Refer to paragraph 17 above.]

19. Related changes in CSS effectiveness. Increase.

Driver Minder alerts the maintainer about equipment and operator faults much sooner and more accurately than contemporary processes. Therefore, operational readiness rates for Driver Minder equipped vehicles will increase even as maintenance personnel requirements are reduced. But this must be demonstrated.

20. Related force structure (equipment and/or organizational) changes

But if Driver Minder works as intended, then it offers promising prospects (reductions) in this regard.

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Developed.

Driver Minder is included in the draft Tactical Interactive Ground Equipment Repair (TIGER) concept. (Should be at HQ TRADOC for approval by 31 Jul 97).

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS: N/A.

None needed.

b. ORD: Unknown.

[No information provided by CASCOM SME as to status of ORD.]

c. BOIP: N/A.

Driver Minder will be applied as an equipment change proposal (ECP) to designated vehicle systems specifications. This will result in a Modification Work Order (MWO).

23. CSS E/I training in TRADOC schools. No.

Not yet.

24. Examined in

a. TF XXI AWE (Mar 97). No.

b. TRAC's Div design Analysis Study. No.

c. The Nov 97 DAWE. No.

25. Tested elsewhere. Yes.

Use of Driver Minders is well established, especially by large commercial truck fleet operators- Yellow, UPS, etc.

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. No.

Not yet. Developing POM submission now (25 Jun 97).

27. Planned BOIP (connectivity between FPs). N/A.

Driver Minder will be a MWO to designated systems.

28. Technical capabilities. Proven.

In the commercial market.

29. LIA's 15 elements of ILS assessment. Not Assessed.

[May be too early in its life cycle development.]

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). No.

b. In time for the First Digitized Corps (2006). Unknown.

[SME indicated "This is contingent on successful proof-of-principle and funding." Based on this response, this study team elected to assign an "Unknown."]

c. During FY 07-10. Unknown.

[SME indicated "If required." However, based on this reply and the one above, this study team elected to assign an "Unknown."]

31. Overall Peacetime (Programmatic) risk. Amber.  
Complete lack of funding.

[Plus unknown status of the ORD; however, technical capabilities have been proven in the civilian sector.]

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.  
Threat: Same as for end item to which it is attached.

33. Likelihood of prerequisite C,CS or CSS E/I wartime degradation. N/A.

34. Wartime backup (BU) system. Electronic Technical Manuals (ETM) running on the Pocket Unit Maintenance Aid (PUMA) would provide on-the-spot diagnostics and parts requisitioning capabilities (if indeed PUMA is available). During combat, Battle Damage Assessment and Repair (BDAR) will be appropriately applied. Otherwise, there will be a return to current practices-manual diagnostics (without TMDE) and repair parts ordering.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available.  
N/A.

There likely will always be some form of available backup system, even if it has to be manual.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. Medium.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Medium.  
Limits us to current capabilities in the non-FP1 packages. Lacking the accurate diagnostics and reporting capabilities of SACIMS, it is likely that tanks not equipped with it would exhibit reduced operational readiness compared to FP1 units.



Limits us to current capabilities in the non-FP1 packages. Lacking the accurate diagnostics and reporting capabilities of SACIMS, it is likely that tanks not equipped with it would exhibit reduced operational readiness compared to FP1 units.

38. Other adverse wartime impacts (e.g., scenario dependent). None.

39. Overall wartime risk associated with employment of this CSS E/I. Green.

40. Overall risk (considering both programmatic and wartime risks). Amber.  
Lack of funds.

41. Ordinal ranking of this CSS E/I by the CSS DCDs.

42. Cardinal ranking of this CSS E/I by the CSS DCDs.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities.

44. Remarks. None

45. Data Sources. Mr. William Kasper, CASCOM (DCD-Ord Dir), DSN: 687-0255. CASCOM Sep 96 CSSMMP and related May 97 updates.

1. Title. Drivers Vision Enhancer (DVE).

2. Designation. FXXI CSS Initiative.

a. Description: DVE is a vehicle-mounted infrared imaging device. It allows vehicle operators to see in total darkness, daylight and when vision is obscured by blowing sand, dust, smoke, etc. A combat vehicle DVE and tactical wheeled vehicle (TWV) will be available.

b. Characteristics: DVE satisfies a critical need for operation of TWV during times of reduced visibility. The DVE consists of a sensor module, display/control module, positioning module, wiring harness and mounting equipment. The DVE will provide a field of view of not less than 20 degrees vertical and 40 degrees horizontal with the capability to pan the sensor for side and rear viewing. DVE allows operators to attain nighttime driving speeds of 55-60 percent of daytime speed, recognize objects up to 22 inches in size at a distance 360 feet away.

c. Mission: Existing night vision goggles provide a limited capability to operate in darkness but do not provide the vision necessary to operate at the speeds required to perform resupply missions for maneuver forces. Resupply capability will be significantly enhanced by 24 hour operations that are consistent with the logistics plan. Currently in darkness, TWVs must rely on headlights, black-out lights, or guides walking in front of the vehicle. Light increases the potential for detection and ground guides walking in front slow down the vehicle. The DVE will not totally replace Night Vision Goggles (NVG). NVG will continue to be used to perform preventative maintenance checks and services, traffic control, reconnaissance functions, and worn by maintenance personnel. DVE will be capable of being attached/removed from all existing vehicles and/or replacement vehicles.

d. Milestones: Special IPR (LRIP)-4QFY95, MS III-3QFY97, FUE 4QFY98.

3. DTLOMS Area.

a. Primary: Materiel.

b. Secondary: None.

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Modernization.

5. CSS BOS Function.

a. Primary: Distribute.

b. Secondary: Arm, Fuel, Fix, Sustainment Engineering.

6. FXXI Priority. Low.

DVE was listed as priority #6 out of 7 CASCOT (DCD-Trans Dir) FXXI entries.

[Thus this study team assigned a "Low" response here.]

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. None.

[DVE was not listed in this Plan.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Briefed. HQ TRADOC 31 Jan 97 briefing charts indicated that DVE was "Red" (Money is not in the POM or programmed to be in the POM for the First Digitized Division until after FY 06. Also, HQ TRADOC recommended an additional \$13.4M by FY 00, an additional \$18.7M by FY 03, and an additional \$19.5M by FY 06-to equip FXXI Divisions and Corps slice and to start the fill for other FP 1 units. Equip vehicles other than PLS-E.

9. The 1996 US Army Modernization Plan. Not Reviewed.

10. Prerequisite(s).

a. FXXI E/Is. None.

b. Other prerequisites. None.

11. Overall risk status of

a. Prerequisite E/Is. N/A.

b. Other prerequisites. N/A.

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. N/A.

b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function?  
Unknown.

[SME indicated that DVE is critical for the Bradley Fighting Vehicle System-ODS variant. However, this study team does not know if such is a FXXI Combat enabler/initiative.]

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. Unknown

[This study team does not know the effect on the Bradley-ODS variant if DVE is not fielded.]

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? Specify.

[PLS trucks in the PLS-DISCOM XXI initiative or perhaps the HEMT-LHS.]

16. Supporting analytical studies. Yes.

PM DVE performed an economic analysis on DVE.

17. Changes in manpower requirements caused by fielding this given CSS E/I. None.

Still requires two drivers per vehicle and a 24 hour operation.

18. Related changes in CSS efficiency. Increase.

We can expect 10-20% more efficiencies in employment of tactical wheeled vehicles. This will make the vehicle movement capability match model (Concept Analysis Agency's (CAA) use of the Force Analysis Simulation of Theater Administrative and Logistical Support (FASTALS) model) expectations.

[SME indicated that the 10-20% increase was used in the recent TAA process. Also, a 10-20% increase in efficiencies from DVE use (SME-MJ) will certainly help maneuver commanders.]

19. Related changes in CSS effectiveness. Increase.

We can expect unit convoys to move 55% faster a night and during other periods of low visibility. This will allow commanders to make more trips per day/night.

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself). None.

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Developed.

Approved by the Chief of Transportation in 1992-1993.

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. Yes.

Approved Oct 90.

b. ORD. Yes.

Approved Jul 93.

[A CASCOM 12 Aug 97 briefing to MG Guest indicated that CASCOM is developing an update to the ORD, with a Sep 97 CASCOM completion timeline.]

c. BOIP. Yes.

T060AA, Aug 94. Basis of issue/TOTAL REQUIREMENT: LIN: Z24522, BOIP #: T060-AA-S  
The total Army requirement is one DVE per TWV. The near term DVE requirement for 2  
Digitized Divisions and 1 Corps slice is 2246 systems.

23. CSS E/I training in TRADOC schools. No.

No for the DVE for Tactical Wheeled Vehicles. Training could be underway for DVE used on Bradley-ODS variants.

24. Examined in

a. TF XXI AWE (Mar 97). Yes.

Test results showed that the DVE had a 100% operational readiness rate for 30 days.

[CASCOM 17 Apr 97 briefing notes indicated that the DVE "...received limited use during the AWE, but soldiers felt it was an improvement of the current night vision devices."]

b. TRAC's Div Design Analysis Study. No.

c. The Nov 97 DAWE. Yes.

25. Tested elsewhere. Yes.

The 3rd AD is getting DVE in Dec 96. The technical capabilities of DVE have been validated and tested at several prior NTC rotations (results indicated that DVE had a high operational readiness rate). Also, 38 Tactical Wheeled Variant DVEs procured for TF Eagle being installed now in Military Police Uparmored HMMWVs. Tracked vehicle variant currently being fielded in 3rd Infantry Division Bradleys. Test and Evaluation Command (TECO)-LEE evaluated the DVE in May 95 at an NTC rotation. Findings indicated that the DVE performed well.

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. No.

Not funded for Tactical Wheeled Vehicles (but is funded for the Bradley-ODS variant and will be going on the Grissly.)

PROGRAM STATUS: DVE is currently unfunded. Estimated unit cost is \$15,000. \$37M in funding from FY 98-FY05 required to fund initial units. 12 prototype DVEs being used in TF XXI. 38 Tactical Wheeled Variant DVEs procured for TF Eagle being installed now in Military Police Uparmored HMMWVs. Tracked vehicle variant currently being fielded in 3rd Infantry Division Bradleys.

27. Planned BOIP (connectivity between FPs). Yes.

[Plans call for fielding DVE to all four FPs.]

28. Technical capabilities. Proven.

[Refer to paragraph 25 above. Other CASCOM documents indicate that DVE is COTS technology and the technical risk is low.]

29. LIA's 15 elements of ILS assessment. Assessed.

[This study team was able to determine that OPTEC did conduct an ILS review for the DVE. However, limited study time precluded any further attempts to acquire their assessment.]

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). Unknown.  
Depends on the availability of funds.

b. In time for the First Digitized Corps (2006). Unknown.

c. During FY 07-10. Unknown.

31. Overall Peacetime (Programmatic) risk. Amber.  
Due to lack of funds.

[Successful prior testing and COTS technology keep DVE from being rated "Red" by this study team.]

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.

33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation. N/A.

34. Wartime backup (BU) system. BU system would be the use of night vision goggles by drivers.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. N/A.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. Medium.  
Vehicles would go slower if drivers had to use night vision goggles.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Medium. Some units would not be able to move as quickly in low visibility conditions; i.e., they could not keep pace with the rest of the force.

38. Other adverse wartime impacts (e.g., scenario dependent). None.

39. Overall wartime risk associated with employment of this CSS E/I. Green.

40. Overall risk (considering both programmatic and wartime risks). Amber.  
Lack of Funds.

41. Ordinal ranking of this CSS E/I by the CSS DCDs.

42. Cardinal ranking of this CSS E/I by the CSS DCDs.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities. N/A.

44. Remarks. None.

45. Data Sources. MAJ Ogburn, CASCOM (DCD-Trans-Dir), DSN: 687-0492.

1. Title. Electro-Optic Test Facility (EOTF)- Integrated Family of Test Equipment (IFTE)

2. Designation. FXXI CSS Enabler.

Fielding the EOTF will offset the required capability to reduce logistics footprint.

[Also, preliminary results from on-going TRAC-LEE EOTF analyses indicate that a reduction in Division-level manpower requirements is likely due to EOTF employment.]

a. Description: The Electro-Optic Test Facility, a component of the IFTE will automatically test, diagnose and verify correct operation of electro-optics (EO) line replaceable units (LRU), shop replaceable unit (SRU) and associated assemblies/subassemblies. When employed at non-divisional Aviation Intermediate Maintenance (AVIM) and/or at GS units, the EOTF is capable of fault isolation malfunctions to the piece part level.

b. Characteristics: The Electro-Optic Test Facility (EOTF) will contain a reconfigurable Electro-Optic Test Station (EOTS) which comprises a flexible ATE system and optical test equipment in a standard shelter or van. It has the capability to provide necessary measurement and stimulus functions to test and fault-isolate optical and electro-optic LRU and SRU to the piece part level.

c. Requirement/Need/Mission: An urgent requirement exists for automatic test equipment at I, DS, AVIM , and operational units with missions to support highly complex electro-optic systems that are associated with missiles, aircraft, Armor and combat vehicle. The test sets will be capable of testing FLIR, Laser Range Finder/Designator Systems (LRF/D), TV Display Systems, Direct View Optics Systems (DVO), and Trackers. The EOTF will replace approximately 14 currently fielded EO test sets.

d. Milestones: FUE: 1st QTR FY 99

3. DTLOMS Area.

a. Primary: Materiel

b. Secondary: None.

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Both.

Replaces multiple special purpose (analog) automatic test equipment with a single DOD approved family of automatic test equipment.

5. CSS BOS Function.

a. Primary: Fix.

b. Secondary: None.

6. FXXI Priority. High.



Based on verbal assessment by Chief of Ordnance. Also, there is a high level of interest for the entire IFTE program at HQDA.

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. High.

[The IFTE family was prioritized #4 out of 51 total items. Also, it was prioritized #1 out of 21 Ordnance items.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed.

[SME responded that the IFTE program made the second band (of priorities) but that such was not forwarded by HQ TRADOC to HQDA.]

9. The 1996 US Army Modernization Plan. Reviewed.

Page I-14 of this Plan in the Core Support section discusses the IFTE family of test equipment. "...This program (IFTE) is rated "Red" for the near-term (FY 96-98) and "Amber" for the mid-and far-terms (FY 99-11). The shortfall must be overcome by a combination of system specific or antiquated test equipment, all of which increase operational costs.

10. Prerequisite(s).

a. FXXI E/Is. None.

b. Other prerequisites. None.

11. Overall risk status of

a. Prerequisite E/Is. N/A.

b. Other prerequisites. N/A.

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. N/A.

b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? Specify. The EOTF will be needed by selected (TBD) FXXI weapon systems. Some of these systems may be designated FXXI Combat, CS or CSS enablers/initiatives.

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. Medium.

[Without the EOTF older legacy test equipment will have to be retained in the field. Ongoing TRAC-LEE analyses indicate that such action is not preferred, as employment of the EOTF reduces maintenance manhours and is cheaper.]

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? Specify.  
The IFTE components (Base Shop Test Facility (BSTF), E OTF, Electronic Repair Shelter (ERS), SPORT) taken collectively supplement the Multicapable Maintainer. Without IFTE, the Multicapable Maintainer would not realize the full synergy required for the FXXI maintenance concept and as impacted by the planned reductions in maintenance force structure. Also, the fielding of the EOTF would enhance the readiness of many other major weapon systems, and permit the retirement of existing obsolete maintenance intensive support systems (LCSS, EQUATE, DSETS, Simplified Test Equipment-Internal Combustion Engine (STE-ICE), etc.).

16. Supporting analytical studies. Yes.

IFTE COEA, Jan 92-identified 80% No Evidence Of Failure (NEOF) reduction using the Contact Test Set (CTS); Mission Area Analysis (MAA) part 14, 6/82-identified lack of and need for general purpose reconfigurable automatic test equipment at Direct Support (DS) and general support (GS) maintenance levels; MAA, Vol 1, 31 Jul-identified shortage of expert diagnostic maintenance tools for missile systems; US Army Ordnance Missile Munitions Center and School (USAOMMC&S), mission area deficiency-identified need for more efficient method of receiving, storing and using information in the field.

[Further, the ongoing TRAC-LEE EOTF analysis supports EOTF employment.]

17. Changes in manpower requirements caused by fielding this given CSS E/I. Decrease.

[a. SME responded "Unknown. Believe the retirement of displaced systems will offset or reduce manpower requirements."

b. However, emerging results from an on-going TRAC-LEE EOTF analysis indicate that EOTF employment will reduce manpower requirements. Amount of reductions varies based on employment schemes, and whether the EOTF is combined with the BSTF as part of an aggressive program for modernizing all legacy automated test equipment. Based on the above this study team elected to respond with a "Decrease."]

18. Related changes in CSS efficiency. Increase.

Greater accuracy and reduced time to diagnose and replace Units Under test (UUT). Elimination of unsupportable test equipment.

19. Related changes in CSS effectiveness. Increase.

The greater accuracy and reduced time in diagnosing and replacing UUT will indirectly increase the operational availability rates of supported systems.

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself).  
Decrease.

[SME responded "Unknown." However, another CASCOM SME coordination CEFA inputs defined this item to be an "enabler" since it would likely "offset the required capability to reduce the logistics footprint." Therefore, this study team elected to assign a "Decrease."]

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Developed.

No need for a separate concept. The Army will use existing/emerging maintenance concepts and doctrine.

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. Yes.

[SME did not provide a date when the MNS, ORD or BOIP were approved. However, a 12 Aug 97 CASCOM briefing on "CSS FXXI Concepts/MNS/ORD" status indicates that the IFTE ROC update is undergoing world-wide staffing, with completion expected 30 Sep 97.]

b. ORD. Yes.

c. BOIP. Yes.

BOIP is pending changes.

BOIP/TOTAL REQUIREMENT: BOIP for the Electro-Optic Facility is one per Shop Set (LIN Z41592) in support of AVENGER, one per Shop Set (LIN T31784) in support of ABRAMS tank. Total requirement will be approximately 64 (FP I-40; FP II-24; FP III-0; FP IV-0).

23. CSS E/I training in TRADOC schools. Yes.

24. Examined in

a. TF XXI AWE (Mar 97). No.

b. TRAC's Div Design Analysis Study. No.

c. The Nov 97 DAWE. No.

25. Tested elsewhere. No.

[SME responded that an "User Assessment" test for the EOTF is to be conducted at an yet-to-be-determined date.]

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. Yes.

Funding exists in the FY 98-03 POM to meet the Army Objective. Also, there is Research & Development funding in the EPP for the EOTF. PROGRAM FUNDING: MDEP FL8G; SSN MB4003. Estimated cost per unit; \$1.5M.

[CASCOM briefed the CDR TRADOC on 3 Apr 97 that the cost of the EOTF is \$2.15M each, and that an additional \$41.9M was needed then "but requirement continues to evolve." This 3 Apr 97 information has not to date been clarified in relationship to the above information also provided by CASCOM for this CEFA.]

27. Planned BOIP (connectivity between FPs). Yes.

[SME responded "Not Relevant." Further, this study team was only provided funding information as shown in paragraph 26 above, without any breakout by FP or by individual IFTE component. However, paragraph 22 above indicates "...Total requirement will be approximately 64 (FP I-40; FP II-24; FP III-0; FP IV-0). Thus this study team responded with a "Yes."]

28. Technical capabilities. Proven.  
COTS/NDI.

29. LIA's 15 elements of ILS assessment. Unknown.

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). Unknown.

[On 12 May 97 the CASCOM SME responded with a "Yes" to this question, and provided the information as cited in paragraph 2 above "...MILESTONES: FUE: 1st QTR FY 99." However, a month earlier (3 Apr 97) CASCOM briefed CDR TRADOC that the EOTF has a projected fielding date "in the Digitized Division" of FY 02. Until it is clarified that the First Digitized Division will in fact receive the EOTF by FY 2000, this study team elected to use the information given to CDR TRADOC (albeit a month earlier) and assigned an "Unknown" response.]

b. In time for the First Digitized Corps (2006). Yes.

c. During FY 07-10. N/A.

31. Overall Peacetime (Programmatic) risk. Amber.

[SME indicated an "Amber" rating is appropriate from a technical aspect. He cited the need to integrate a BSTF and the Navy CASS. Also, he said that not all of the Test Program Sets (TPS) needed by the EOTF have yet been funded. This study team however is under the impression that TPS are generally funded by the PM for the supported weapon system. Also, information on funding in paragraph 26 above ("Funding exists in the FY 98-03 POM to meet the Army Objective. Also, there is Research & Development funding in the EPP for the EOTF.") does not mention the lack of any TPS funds. This is not resolved to date.]

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.

EOTF is composed mainly of developmental items based on COTS; RAM failures are expected to be minimal. Threat to the EOTF would be no worse than the threat expected to other divisional/Corps maintenance units.

33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation. N/A.

34. Wartime backup (BU) system. No BU systems are planned for the EOTF. We would have to use EOTFs found in other maintenance units, or evacuate the Unit-Under-Test (UUT) to the next higher/adjacent area having adequate automatic test equipment.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. Medium. Delay times in diagnosing failed UUTs would increase, causing possible increases in the number of items requiring stockage as well as adversely affecting supported weapon system operational availability rates.

[Based on the above SME response, this study team assigned a "Medium."]

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. N/A. No BU system is planned.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Medium.

[a. SME responded "Unknown" and discussed that fielding IFTE program components is constrained by the availability of funds, completed TPS for the supported systems, and sufficient supporting manpower.

b. However, as discussed in paragraph 22 above "...Total requirement will be approximately 64 (FP I-40; FP II-24; FP III-0; FP IV-0). If some units do not receive the EOTF they may have to retain their present automatic test equipment. In these cases when their weapon systems receive upgrades or new systems are fielded, then they will not be able to support automatic test diagnosis with the present (legacy) test equipment."

c. Thus, for these units we would likely have to increase our stockage of UUTs in the theater. This in turn will drive up CL IX costs and adversely affect the usage of in-theater transportation assets. Based on the above discussion, this study team assigned a "Medium" response to this question.]

38. Other adverse wartime impacts (e.g., scenario dependent). Unknown.

[SME responded with an "Unknown." This study team elected to leave this response, but tends to think that a "None" response could be more appropriate.]

39. Overall wartime risk associated with employment of this CSS E/I. Amber.

[SME responded in paragraph 32 above that there is a "Low" likelihood that the EOTF will suffer wartime degradation. However, in paragraph 35 above a "Medium" adverse wartime impact was

assigned if the EOTF did in fact become inoperable during a war with no available BU systems. Thus, the SME assigned an "Amber" response to this question.]

40. Overall risk (considering both programmatic and wartime risks). Amber

[SME indicated "Amber" ratings (a) from a technical aspect for the peacetime risk (paragraph 31 above), and (b) from a wartime employment risk (paragraph 40 above).]

41. Ordinal ranking of this CSS E/I by the CSS DCDs.

42. Cardinal ranking of this CSS E/I by the CSS DCDs.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities.

44. Remarks. None

45. Data Sources. MAJ Mabry, CASCOM (DCD-Ord Dir), DSN: 687-0342). CASCOM Sep 96 CSSMMP and related May 97 updates.

1. Title. Electronic Repair Shelter(ERS)- Integrated Family of Test Equipment (IFTE)

2. Designation. FXXI CSS Enabler-ORC

Fielding the EOTF will offset the required capability to reduce logistics footprint.

a. Description: The IFTE Electronic Repair Shelter will consist of state-of-the-art electronic repair equipment housed in an environmentally controlled shelter. It will contain a minimum of two work stations and be equipped to repair multi-level circuit cards. It will be fielded at corps level and above. The ERS will replace the Electronic Quality Assurance Test Equipment (EQUATE) repair facility for support of selected systems. Fielding of the ERS will reduce the battlefield foot print and avoid excessive operating cost.

b. Characteristics: The prototype will be housed in a revamped 39 foot van currently being used as repair facility for the AN/USM-105 EQUATE. It initially will be equipped with both the Mantek and Schumberge circuit card test sets with necessary tools and equipment to perform multi-level circuit card repair. It will have a storage area within the van for storage of test program sets (TPS). The ERS is considered GS test equipment and will be operated and maintained by MOS 35Y.

c. Requirement/Need/Mission: An urgent requirement exists for state-of-the-art circuit card repair in the TOE Army. Current procedures require circuit cards coded X to be replaced without repair, circuit cards coded D are repaired at Depot only. The ERS will allow both card codes to be repaired in the field using soldiers, providing savings in both maintenance turn around time and money.

d. MILESTONES: Prototype complete May 96, FUE: 1st QTR FY 98.

3. DTLOMS Area.

a. Primary: Materiel

b. Secondary: None

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Both  
Replaces multiple special purpose (analog) automatic test equipment with a single DOD approved family of automatic test equipment.

5. CSS BOS Function.

a. Primary: Fix.

b. Secondary: None.

6. FXXI Priority. High.

Based on verbal assessment by Chief of Ordnance. Also, there is a high level of interest for the entire IFTE program at HQDA.

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. High.

[The IFTE family was prioritized #4 out of 51 total items. Also, it was prioritized #1 out of 21 Ordnance items.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed.

[SME responded that the IFTE program made the second band (of priorities) but that such was not forwarded by HQ TRADOC to HQDA.]

9. The 1996 US Army Modernization Plan. Reviewed.

[Page I-14 of this Plan in the Core Support section discusses the IFTE family of test equipment." This program (IFTE) is rated "Red" for the near-term (FY 96-98) and "Amber" for the mid-and far-terms (FY 99-11). The shortfall must be overcome by a combination of system specific or antiquated test equipment, all of which increase operational costs.]

10. Prerequisite(s).

- a. FXXI E/Is. None.
- b. Other prerequisites. None.

11. Overall risk status of

- a. Prerequisite E/Is. N/A.
- b. Other prerequisites. N/A.

12. Adverse programmatic (peacetime) risks on

- a. The "prerequisite" E/Is if this given CSS E/I is not fielded. N/A.
- b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? Specify.

The ERS will be needed for the repair of Units-Under-Test (UUT) from selected (TBD) FXXI weapon systems. Some of these systems may be designated FXXI Combat, CS or CSS enablers/initiatives.

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. Medium.

[Without the ERS, UUTs requiring repair will have to be evacuated to a higher echelon of maintenance. This in turn will necessitate the stocking of more UUTs in-theater in order to maintain weapon system operational availability rates.]

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? Specify.



The IFTE components (BSTF, EOTF, ERS, SPORT) taken collectively supplement the Multicapable Maintainer. Without IFTE, the Multicapable Maintainer would not realize the full synergy required for the FXXI maintenance concept and as impacted by the planned reductions in maintenance force structure. Also, the fielding of the EOTF would enhance the readiness of many other major weapon systems, and permit the retirement of existing obsolete maintenance intensive support systems (LCSS, EQUATE, DSETS, STE-ICE, etc.).

16. Supporting analytical studies. Yes.

IFTE COEA, Jan 92-identified 80% No Evidence Of Failure (NEOF) reduction using the CTS, MAA part 14, 6/82-identified lack of and need for general purpose reconfigurable automatic test equipment at Direct Support (DS) and general support (GS) maintenance levels; MAA, Vol 1, 31 Jul-identified shortage of expert diagnostic maintenance tools for missile systems; USAOMMC&S, MADP deficiency-identified need for more efficient method of receiving, storing and using information in the field.

17. Changes in manpower requirements caused by fielding this given CSS E/I.

Unknown. Believe the retirement of displaced systems will offset or reduce manpower requirements.

18. Related changes in CSS efficiency. Increase.

Greater accuracy and reduced time to repair UUTs. Elimination of unsupportable test equipment.

19. Related changes in CSS effectiveness. Increase.

The greater accuracy and reduced time in providing in-theater UUT repair will increase the operational availability rates of supported systems.

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself). Decrease

[SME responded "Unknown." However, another CASCOM SME coordinating CEFA inputs defined this item to be an "enabler" since it would likely "offset the required capability to reduce the logistics footprint." Therefore, this study team elected to assign a "Decrease."]

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Developed.

No need for a separate concept. The Army will use existing/emerging maintenance concepts and doctrine.

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. Yes.

[SME did not provide a date when the MNS, ORD or BOIP were approved. However, a 12 Aug 97 CASCOM briefing on "CSS FXXI Concepts/MNS/ORD" status indicates that the IFTE ROC update is undergoing world-wide staffing, with completion expected 30

Sep 97. Further, the SME stated that changes to the existing IFTE ORD and BOIP are planned for the SPORT and ERS components.]

b. ORD. Yes.

c. BOIP. No.

The ERS BOIP is pending final approval.

BOIP/TOTAL REQUIREMENT: BOIP for the Electronic Repair Shelter is one ERS per Electronic Maintenance Platoon, TOE 43549LM. It will replace LIN R09696. Estimated total requirements to be 14. (Force Package I = 10, FP II 4).

23. CSS E/I training in TRADOC schools. Yes.

24. Examined in

a. TF XXI AWE (Mar 97). No.

b. TRAC's Div Design Analysis Study. No.

c. The Nov 97 DAWE. No.

25. Tested elsewhere. Yes.

ERS User Assessment is on-going (as of 5 May 97) at Ft Hood. The then emerging test results indicated that they realized some cost savings over the current way of doing business.

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. Yes.

Funding exists in the FY 98-03 POM to meet the Army Objective.

PROGRAM FUNDING: MDEP FL8G; SSN MB2201. Estimated cost per unit; \$900K.

27. Planned BOIP (connectivity between FPs). Yes.

[SME responded "Not Relevant." Further, this study team was only provided funding information as shown in paragraph 26 above, without any breakout by FP or by individual IFTE component. However, paragraph 22 above indicates "Estimated total (ERS) requirements to be 14. (FP I = 10, FP II 4)." Thus this study team responded with a "Yes."]

28. Technical capabilities. Proven.  
COTS/NDI.

29. LIA's 15 elements of ILS assessment. Unknown.

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). Yes.

[SME responded "N/A" and indicated that ERS is a Corps-level item. However, given the information in paragraph 26 above, this study team assumed that the ERS will likely be available to support the First Digitized Division, and therefore assigned a "Yes."]

b. In time for the First Digitized Corps (2006). Yes.

[SME responded "Yes" to FY 2006. Also, in a 3 Apr 97 CASCOM briefing to the CDR TRADOC, CASCOM indicated that the projected fielding date of the ERS to the Digitized Corps was FY 02.]

c. During FY 07-10. N/A.

31. Overall Peacetime (Programmatic) risk. Green.

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.  
ERS is composed mainly of developmental items based on COTS; RAM failures are expected to be minimal. Threat to the ERS would be no worse than the threat expected to other Corps maintenance units.

33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation. N/A.

34. Wartime backup (BU) system. No BU systems are planned for the ERS. We would have to evacuate the UUT to the next higher/adjacent area having an ERS.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. Medium.

Delay times in repairing failed UUTs would increase, causing possible increases in the number of items requiring stockage, as well as adversely affecting supported weapon system operational availability rates.

[Based on the above SME response, this study team assigned a "Medium."]

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. N/A.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Medium.

[a. SME responded "Unknown" and discussed that fielding IFTE program components is constrained by the availability of funds, completed TPS for the supported systems, and sufficient supporting manpower.

b. Paragraph 22 above indicates "Estimated total (ERS) requirements to be 14. (Force Package I = 10, FP II 4)." However, Corps maintenance units that may not receive the ERS would have to find alternate means to repair UUTs. Thus, they may have to increase their stockage of UUTs. This in turn could drive up CL IX costs and adversely affect the usage of in-theater transportation assets. Based on the above, this study team assigned a "Medium" response to this question.]

38. Other adverse wartime impacts (e.g., scenario dependent). Unknown.

[SME responded with an "Unknown." This study team elected to leave this response, but tends to think that a "None" response could be more appropriate.]

39. Overall wartime risk associated with employment of this CSS E/I. Amber.

40. Overall risk (considering both programmatic and wartime risks). Amber.

[Due to its estimated wartime employment risk.]

41. Ordinal ranking of this CSS E/I by the CSS DCDs.

42. Cardinal ranking of this CSS E/I by the CSS DCDs.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities.

44. Remarks. None

45. Data Sources. MAJ Mabry, CASCOM (DCD-Ord Dir), DSN: 687-0342). CASCOM Sep 96 CSSMMP and related May 97 updates.

1. Title. Electronic Technical Manuals (ETM)

2. Designation. FXXI CSS Initiative.

a Description: ETM's are paper Technical Manuals (TM), Technical Bulletins (TB), Supply Circulars (SC), LO's, MWO's, HR's, FM's and HR's converted to digital format and placed on compact disk (CD). The CD will display exact representation when viewed on a computer screen. Hypertext links provide quick access to specific pages, figures, tables and other TM's. The software viewing tool is Adobe Acrobat Reader which resides on each CD.

b Characteristics: Provides electronic access to TM's, TB's, SC's, LO's, MWO's, HR's, FM's and HR's which are read by Adobe Acrobat Reader and viewed on automated hardware. ETM's are a smaller/lighter configuration of paper TM's (40,000 pages on one CD). which make loads lighter for deployment and less expensive/easier distribution. Needs associated hardware (COTS automation/TMDE) to be accessed.

Laptop/notebook computer:

- (1) 486DX4/100MHz Processor
- (2) 8/16 MB RAM
- (3) 540 MB Hard Drive
- (4) 2x CD - Read Only Memory (ROM) Drive
- (5) 14.4 BPS Fax/Modem
- (6) Active matrix color
- (7) Magnesium cover to protect display
- (8) Keyboard skin, trackball o-ring to inhibit sand penetration
- (9) Carrying case, extra battery

Cruise Local Area Network (LAN) System is a wireless technology being tested during the ETM initiative. It has a Portable Computer (PC) with multi CD reader capability, with hardware access points that up to 60 cruise pads can access ETM's via radio frequency:

(1) Zenith Cruise pad:

- (a) 3.5 "dumb terminal"
- (b) Radio frequency proximity device
- (c) Touch screen interface
- (d) Padded drop-proof case
- (e) Daylight viewable transfective monochrome for

outdoor use

(2) Multi-user Server:

- (a) PC with eight Giga Byte hard drive
- (b) Multi CD reader
- (c) Hard wired access points

(3) Requires further testing

c. Requirement/Need/Mission: The power projection Army requires technologies that will assist soldiers in maintenance and supply procedures with improved efficiencies. ETM's will interface with current and future STAMIS' and TMDE; to expedite supply procedures and for more accurate diagnostic capabilities. ETM's will assist in reducing the error in ordering CL IX repair parts which will save funds and increase readiness.

3. DTLOMS Area.

- a. Primary: Materiel
- b. Secondary: Training, Doctrine.

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Both.

5. CSS BOS Function.

- a. Primary: Fix.
- b. Secondary: None.

6. FXXI Priority. High.

Based on the fact that this initiative was directed in Jan 95 by the HQDA DCSLOG.

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. None.

[ETM was not listed in this Plan.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed

[Briefing charts did not indicate that additional funding was requested for ETM.]

9. The 1996 US Army Modernization Plan. Not Reviewed.

[ETM was not reviewed in this Plan.]

10. Prerequisite(s).

- a. FXXI E/Is. None.
- b. Other prerequisites. None.

11. Overall risk status of

- a. Prerequisite E/Is. N/A.
- b. Other prerequisites. N/A.

12. Adverse programmatic (peacetime) risks on

- a. The "prerequisite" E/Is if this given CSS E/I is not fielded. N/A.
- b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? Specify.

Any system requiring TMs in order to utilize and maintain equipment. The Interactive ETM (IETM) are really Class III, IV and V versions of ETM. With IETM the mechanic interfaces directly into the supported systems via electronic connections and uses electronic technical manuals for diagnosing problems. Without ETM the IETM concept cannot exist.

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. High. The adverse impact on IETM would be very high if ETM were not fielded. IETM absolutely require ETM to function.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? Specify. ICS3 (Unit Level Logistics System (ULLS) and Standard Army Maintenance system (SAMS), SPORT, IFTE (CTS III).

ICS3 (ULLS and SAMS) will be ETM-I rehosts for input data collected by the mechanic (parts needed, faults, corrected faults, service information) via a 3.5 disk or smart card. This will save clerk's time by not having to try and read/interrupt the mechanic's information, and then manually input the data into the STAMIS.

[Also, SPORT and the IFTE (CTS III) would benefit by ETM fielding in that it would assist them in realizing their full potential. Otherwise, when using these latter two systems, a mechanic without ETM would have to revert to the use of paper TMs for diagnosing faults. This would cause excessive delays and extra expenditures of maintenance manhours.]

16. Supporting analytical studies. Unknown.

17. Changes in manpower requirements caused by fielding this given CSS E/I. None. No reduction in actual manpower requirements is expected. However, there will be an increased requirement for MOS 35J to repair the ETM hardware itself. This will be an added burden, but not likely to become an increase in actual manpower.

18. Related changes in CSS efficiency. Increase. ETM's should decrease maintenance personnel manhours in parts research, maintenance services, adding faults/closing faults, not having to post changes, easier to load up for deployment, in some cases ETMs are more durable than paper technical manuals, ordering parts at source (mechanic) and ordering the correct part the first time, reduced training time, and improved distribution of technical manuals.

19. Related changes in CSS effectiveness. Increase. Lighter deployments, reduced weapon system maintenance down time thereby increasing operational readiness rates.

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself). None.

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Developed.

[Operational concept for ETMs has been approved, but the SME did not know the approval date.]

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. Yes.

Approved in the early 1990s and subsequently updated or revised as a result of research and development.

b. ORD. Yes.

Approved in the early 1990s and subsequently updated or revised as a result of research and development.

c. BOIP. N/A.

No BOIP may be necessary as ETM hardware (COTS computers) may become a CTA item. An initial issue of 500 per Heavy Division, 400 per Light Division and a minimal amount for TRADOC schools may take place if a \$15M UFR is granted. Computers needed to read the ETM CD ROMs only need to be 486 DX, 66MHz and Windows-based and are to some extent in use in Army units everywhere. CD ROMs will be distributed using procedures similar to today's distribution of paper TMs.

23. CSS E/I training in TRADOC schools. Yes.

The training package has been fielded to TRADOC schools but is not being trained in all areas.

24. Examined in

a. TF XXI AWE (Mar 97). No.

b. TRAC's Div Design Analysis Study. No.

c. The Nov 97 DAWE. No.

25. Tested elsewhere. Yes.

ETM concept is currently fielded and under evaluation at Ft Stewart, Ft Hood, Ft Campbell, NTC and Ft Carson. The LAN server portion of the ETM concept is being tested at Ft Hood, Ft Stewart and Ft Campbell.

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. Yes.

For fielding into most of FP 1 and FP 2 units for a multitude of supported equipment associated with combat, CS and CSS systems. Initially funded by the LIA. Future funding is unknown. Unfinanced Requirement (UFR) for \$15M requested for COTS hardware submitted (400 readers per Heavy Division, 400 per Light Division and



TRADOC schools). Once fielded, the cost of ETMs will come out of Operations & Maintenance Army (OMA) funds.

Phase I hardware was purchased to test COTS/NDI hardware. Phase II is only for digitization of legacy systems paper TMs. ODCSLOG has given GEN Reimer SEP 97 as a completion date for digitizing legacy systems. General Reimer has been told that the Army can be out of the business of printing paper TMs (except 10 level) but with an associated hardware cost.

27. Planned BOIP (connectivity between FPs). N/A.

The CD ROM aspect of ETMs will be a CTA item. Units will then order ETMs using the 12 series through normal channels to US Army Publication and Printing Command (USAPPC). However, as mentioned above, if the UFR is approved then there will be an initial push of 500 COTS notebook computers to each heavy division, 300 to each light division and an undetermined amount to TRADOC schools.

SPORT will be a platform for CL 3, 4 and 5 IETMs and is a viable host for lower class ETMs. Presently there are over 10,000 requirements for SPORT with required estimates as high as 20,000. Lower level ETMs are a stepping stone to IETMs and are a shorter term solution. No formal BOIP is being developed for ETMs. Authority for readers maybe a CTA 50-909 item. Laptop readers are more cost effective for ETM readers than SPORT. The recommended unit of issue is 1 laptop per 3 soldiers.

28. Technical capabilities. Proven.

Use of ETMs at different Army locations has provided results "more good than bad." The use of COTS notebook computers to host ETMs has been proven in Bright Star (Egypt), in Kuwait, and at Ft Hood, Ft Stewart and at the NTC. Results at these locations were favorable. Also proven in the civilian sector. The use of the LAN server aspect of ETMs is under test now. Also, there will be a Dec 97 test at either Ft Campbell, Ft Hood or Ft Stewart to test an "automated" motor pool (use of the COTS notebook computers and the LAN server all together).

29. LIA's 15 elements of ILS assessment. Unknown.

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). Yes.

(1) We are fielding only the electronic TM aspect (CD ROMs) of the ETM system: There are to be 150 different CDs. The first set of 48 CDs is currently being released Army-wide in Jul-Sep 97. Completion of the remaining 102 CD-based ETM library will occur Army-wide by 30 Jun 98.

(2) We are not fielding (1) the COTS notebooks, as an action is being worked at CASCOM (Jul 97) to allow commanders to buy these as CTA items (about \$2,500 each). CASCOM's request is presently at HQDA ODCSOPS. (2) the LAN servers, as this aspect of the ETM system is not yet fully proven.

b. In time for the First Digitized Corps (2006). Yes.

Completion of Army-wide fielding of the set of 150 CD-based ETM library will occur by 30 Jun 98. Plans to field the rest of the ETM system are "Unknown" pending successful testing and allocation of necessary funding.

c. During FY 07-10. N/A

Completion of Army-wide fielding of the set of 150 CD-based ETM library will occur by 30 Jun 98. Plans to field the rest of the ETM system are "Unknown" pending successful testing and allocation of necessary funding.

31. Overall Peacetime (Programmatic) risk. Amber.

There are insufficient funds for complete fielding of the COTS notebooks to support the CD ROM ETM application. However, use of the LAN server for motor pools is rated "Red" since it has not been proven under battlefield conditions or in a true soldier's environment.

[This study team elected to rate the overall ETM CEFA initiative as "Amber" and to indicate in the Remarks section of this assessment the "Red" rating of the LAN server portion of the ETM system.]

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.

Degradation due to threat is unlikely. A nuclear attack could render electronic equipment inoperative. Degradation due to RAM failure-unlikely, as long as support personnel are available to repair the hardware. Degradation due to a lack of supporting force structure-unlikely, unless there is not enough reader hardware in units to be able to read ETMs and support personnel are trained in the repair of reader hardware.

33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation. N/A.

34. Wartime backup (BU) system.

(a) For the COTS notebook computers: Given that there maybe at a minimum of about 500 COTS notebooks in a Heavy Division, a soldier can borrow one if his becomes inoperative; or he could print out a TM from the CD ROM using another computer; or he could use his CD ROM on a Windows-based portable computer. (b) For the LAN server: One would have to locate and use another portable computer to read his CD ROM disk; or print out the TMs; or simply use available COTS notebooks.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. N/A.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. Medium.

BU systems would not be as efficient/effective, especially if an inoperative LAN server was perhaps linked to 60 dumb terminals.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. High.

Units not receiving ETMs would not be able to perform maintenance, since actions are currently underway to funding for the production of paper TMs (20 series and up). However, as stated above Army-wide fielding of all 150 CD ROMs is slated for completion by Jun 98.

38. Other adverse wartime impacts (e.g., scenario dependent). None.

39. Overall wartime risk associated with employment of this CSS E/I. Green.

Wartime employment of the COTS notebooks and the CD ROMs would be rated "Green." However, employment of the LAN server would be rated "Amber." The LAN becoming inoperative would adversely impact more mechanics at one time. To mitigate this we would need a stronger BU system; e.g., float servers, and currently there are no plans to field such floats.

[This study team chose to assign a wartime risk rating of "Green" for the ETM CEFA initiative, and to indicate a rating of "Amber" for the LAN server in the remarks section of this assessment.]

40. Overall risk (considering both programmatic and wartime risks). Amber

[This study team chose to assign an overall CEFA ETM initiative rating of "Amber" (lack of sufficient funds to buy all the requisite COTS notebooks) as associated with the CD ROM aspect of the ETM concept. The LAN server aspect of the ETM concept was assigned an overall rating of "Red" in that it is still unproven in simulated battlefield conditions, and will be so noted in the Remarks section of this assessment.]

41. Ordinal ranking of this CSS E/I by the CSS DCDs.

42. Cardinal ranking of this CSS E/I by the CSS DCDs.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities.

44. Remarks.

[In conjunction with the CASCOM SME, this study team chose to assign the overall FXXI CSS ETM initiative risk rating solely based on the COTS notebook/CD ROM application of paperless TMs. Thus an overall rating of "Amber." The LAN server aspect of the ETM concept was not used to rate the ETM concept. It was felt that the LAN server is just another extension/application of the ETM concept that has recently evolved. An overall CEFA ETM risk rating of "Red" would not properly reflect the already approved/funded Army-wide fielding NLT Jun 98 of all the 150 CD ROM disks, as well recommended 500 COTS notebooks to each Heavy Division/300 to each remaining Division.]

45. Data Sources. CW3 Goins, CASCOM (DCD-ORD Dir), DSN: 647- 0590.

1. Title. EOD Response Vehicle (EODRV).

2. Designation. FXXI CSS Enabler-ORC.

The EODRV offsets the required capability to have a contact maintenance truck mobile enough to keep pace with supported maneuver units.

a. Description: The EODRV, a version of the Contact Maintenance Truck (CMT), consists of a specially configured shelter mounted on a heavy HMMWV chassis. It is used by a light EOD response team to respond to explosive ordnance incidents on the battlefield.

b. Characteristics: The EODRV shelter is a securable, weather-resistant storage/workspace that allows the EOD soldier to research EOD information, prepare tools and equipment, and perform other EOD related activities. The interior is lighted and has power outlets for 12 and 24 vdc equipment. It is capable unrestricted highway, rail, marine, and C-130 aircraft transport.

c. Requirement/Need/Mission: The Operation Desert Storm Lessons Learned Plan addresses the need to provide an EOD response capability throughout the battlefield. The current CUCV mounted CMT is not able to traverse terrain or maintain speed to keep up with supported units. It is also very difficult to find maintenance assets capable of working on the CUCV in the division areas. The EOD response team's large quantity of heavy, specialized tools and protective equipment typically exceeds the capacity of a standard vehicle. Operationally, the teams needs a place to research classified render safe procedures and prepare tools and equipment for employment.

3. DTLOMS Area.

a. Primary: Materiel

b. Secondary: None.

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Both  
The EODRV requires use of the Movement Tracking System (MTS).

5. CSS BOS Function.

a. Primary: Arm.

b. Secondary: None.

6. FXXI Priority. High.

High within the CASCOM (DCD-OD). The EODRV was on a Jul 95 list of CDR CASCOM's top CSS issues.

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. None.

[The EODRV was not listed in this Plan.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed

9. The 1996 US Army Modernization Plan. Reviewed.

[The Core Support section of the Logistic Annex I, page I-13, discusses the Explosive Ordnance Disposal mission. It does not explicitly discuss the EODRV. However, it reads that "...Improvements are required in the area of remote and robotic ordnance neutralization....The entire Explosive Ordnance Disposal program was rated "Red" for near-mid-far-terms (FY 96-11). No procurement funds are programmed to acquire improved explosive ordnance disposal equipment which is required for rapid and safe clearing of unexploded ordnance on the battlefield."]

10. Prerequisite(s).

a. FXXI E/Is. CSS.

The CMT chassis and the Movement Tracking System (MTS).

b. Other prerequisites. None.

11. Overall risk status of

a. Prerequisite E/Is.

(1) Low. The CMT is rated by CEFA as "Green."

(2) High. The MTS is rated by CEFA as "Red" for fielding the MTS to non-PLS vehicles.

b. Other prerequisites. N/A.

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. None.

b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function?  
None.

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? None.

16. Supporting analytical studies. None

[CASCOM SME referred this study team to any studies conducted for the CMT itself. Refer to the paragraph 16 of the CMT CEFA assessment. It indicates that the CMT SME was not aware of any supporting CMT studies.]

17. Changes in manpower requirements caused by fielding this given CSS E/I. None.

18. Related changes in CSS efficiency. Increase.

Tools will be more organized and more secure(the EODRV will also employ classified CD ROM computer publications, i.e., ETM). Also, the EODRV will allow for more environmental protection; i.e., a dry shelter to work from). This is a proven transportation platform specifically configured to haul EOD tools and equipment. The concept was tested in Bosnia by the 61st EOD. They built a precursor vehicle. Lessons learned from this Bosnian employment support an increase in efficiencies, much so over the plywood boxes built onto the back of vehicles during Operation Desert Storm.

19. Related changes in CSS effectiveness. Increase.

The EODRV will allow EOD units to keep up with maneuver forces, thereby providing them with better EOD support. (Note: the current EOD response vehicle employs the CUCV.)

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself). None.

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Developed.

Use of the EODRV was approved by the Vice Chief of Staff, US Army in the Force Design Update #95-2.

[SME also indicated that the concept for employing an EODRV is approved and is contained in FM 9-15.]

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. Yes.

All supporting documentation was approved in the early 1990's, and subsequently updated or revised in the mid-1990's.

[SME indicated that the approved documentation is the same as the CMT and indicated that "MNS M043-85-93 for EOD. ORD CARDS number 16041. ORD for the Shop Equipment, Contact Maintenance.]

b. ORD. Yes.

[SME indicated that the approved documentation is the same as the CMT.]

c. BOIP. Yes

BOIP/TOTAL REQUIREMENT: The EODRV will be issued 1 per Light (2-soldier) EOD Response Team. It replaces LIN: S31232. Estimated requirement for Force Package I is 135, FP II is 95.

23. CSS E/I training in TRADOC schools. No.  
Not yet.

24. Examined in

a. TF XXI AWE (Mar 97). No.

b. TRAC's Div Design Analysis Study. No.

c. The Nov 97 DAWE. No.

25. Tested elsewhere. Yes.

This is a proven transportation platform specifically configured to haul EOD tools and equipment. The concept was tested in Bosnia by the 61st EOD. They built a precursor vehicle. Lessons learned from this Bosnian employment support an increase in efficiencies, much so over the plywood boxes built onto the back of vehicles during Operation Desert Storm. Also, the EODRV will be tested at Ft McCoy in Aug 97.

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. No.

PROGRAM FUNDING: A Concept Evaluation Proposal was submitted to the CSS Battle Lab for \$202K. The EODRV will be built onto a CMT chassis; CMT funding is in place now. But, procurement funding is still pending "for the EOD 'box' and the requisite MTS devices." CASCOM EODRV CEFA funding matrix indicated that \$8.0M was needed to procure the planned 230 EODRVs, and that 100% of this requirement was unfunded in the POM/EPP.

27. Planned BOIP (connectivity between FPs). No.

The EODRV will be issued one per light (2 soldier) EOD Response Team. Total Requirement= 235 systems. Plans only call for fielding the EODRV to FP 1 and 2, while FP 3 and 4 will retain their CUCV-type response vehicles.

28. Technical capabilities. Proven.

29. LIA's 15 elements of ILS assessment. Unknown.

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). Unknown.

b. In time for the First Digitized Corps (2006). Unknown.

c. During FY 07-10. Unknown.

31. Overall Peacetime (Programmatic) risk. Red.

Due to funding uncertainties and the overall peacetime "Red" CEFA risk rating for fielding the MTS to non-PLS vehicles.

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.

[The CMT CEFA assessment rated the use of the CMT in wartime as a "Low" risk.]

33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation. Low.

[The MTS CEFA assessment rated the MTS as "Low" for likelihood of wartime degradation.]

34. Wartime backup (BU) system. Since the current CUCV-type response vehicles will no longer remain in FP 1 and 2 EOD units, a BU system would be for an EOD specialist to use whatever vehicle he could find to transport his EOD equipment. If a sister FP 3 or 4 units was nearby, then a BU could be the employment of one of their currently fielded CUCV-based response vehicle.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. N/A.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. Medium.

Use of a BU system would likely not allow the EOD units to meet their operational obligations of 10 two hour missions per day. This would result in a decreased capability for EOD units to respond to Unexploded Ordnance that threatens the maneuver's commander's combat power and lines of communication.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Medium.

Units without the planned EODRV will not be as effective in supporting maneuver commanders. Also, there could be a maintenance problem for FP 3 and 4 Corps EOD units that will be retaining their current CUCV-based response vehicles and which normally operate in a division's area. The division generally does not have trained CUCV maintainers or related spare parts; thus, there could be a problem trying to fix an inoperative CUCV-based response vehicle when it is supporting divisional units (its primary mission). This maintenance incompatibility problem would not exist with the EODRV on a HMMWV chassis.

38. Other adverse wartime impacts (e.g., scenario dependent). None.

39. Overall wartime risk associated with employment of this CSS E/I. Green.

40. Overall risk (considering both programmatic and wartime risks). Red

Due to funding uncertainties and the overall peacetime "Red" CEFA risk rating for fielding the MTS to non-PLS vehicles.



- 41. Ordinal ranking of this CSS E/I by the CSS DCDs.
- 42. Cardinal ranking of this CSS E/I by the CSS DCDs.
- 43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities. N/A.
- 44. Remarks. None
- 45. Data Sources. MSG Frey, CASCOM (DCD-OD), DSN: 687-0566.

1. Title. Failure Analysis and Maintenance Planning System (FAMPS).

2. Designation. FXXI CSS Initiative.

[The following was the only FAMPS description provided by the CASCOM SME. This description was a part of a Dec 96 Advanced Technology Concept demonstration (ATCD) Proposal Summary.]

This proposal expands on investments made over the past five years by the U.S. Army Test, Measurement, and Diagnostic Equipment Activities (USATA) and Program Manager-Test Measurement and Diagnostic Equipment (PM-TMDE), specifically in the development and fielding of the CTS III, a ruggedized PC, Interactive Electronic Diagnostic and Repair Manuals (IEDRMs) and systems that combine advances in electronic document delivery with PC-based test instrument technology. The goal is to take full advantage of current and developing technologies in the development of an Anticipatory Maintenance System. The Maintenance Planning portion of FAMPS will take full advantage of today's Information Age technology and will incorporate technologies such as the Worldwide Web (WWW) to distribute Shared Information with other DOD agencies. Such data will include but not be limited to Predictive and Prognostic maintenance and supply information that will be of value to all DOD agencies. The functionality of FAMPS can in the initial stages be furthered as this is not technology insertion. This technology takes full advantage of system sensors that already exists, both analog and digital. This proposed demonstration will leverage existing technology as represented by the FAMPS. The FAMPS is the new Maintenance System's focal point for planning and employing an Anticipatory Maintenance Concept. FAMPS is three things. It is a combination maintenance scheduling system, prognostic analysis system, document handling system, and higher/lower maintenance echelon communication system.

A key element of FAMPS data is the vehicle Health Check Software. The Health Check is a generic prototype system that is currently under development. It will support all systems that are equipped with one of the standard 14 configured Diagnostic Connector Assemblies (Dace's). It is compatible with J1553 and J 1708 data bus technology and receives sensor data from sensors that are already in place. All US Army vehicles are equipped with this capability except the 2 1/2 TN vehicle and M1 series tanks. DOD implications for this capability are easily derived. The Health Check Software can be incorporated into Interactive Electronic Diagnostic and Repair Manuals (IEDRM) or be used as a stand alone tool. It conducts approximately 26 internal combustion engine test automatically in about 10 minutes. Data received from the Health Check will produce Trend analysis. Trend analysis will indicate all the critical individual parameters of a weapon system such as engine oil temperature, and plots the reading taken. Over a period of time trends will begin to develop. Plotting these trends on a chart with upper and lower limits for a particular vehicle or fleet will indicate when a vehicle is at the initial stage of developing a problem. This is the point where predictive maintenance is done. Using Trend analysis in maintenance management will cause a revolution in maintenance across all DOD components. Our maintenance systems will become pro-active instead of reactive. Furthermore we will become consumption based instead of demand based. Real efficiencies in our supply system as it relates to maintenance will be realized.

The heart of FAMPS is the Mission Maintenance data Base (MMdB). The MMdB is a data base that will be grown into an expert system. It receives data from four sources, vehicle health check, IEDRM Maintenance Management System and Operating Environment input from the Operator. The MMdB also stores data received from the IEDRM. This data is a step by step tracking of data generated by the IEDRM during troubleshooting, maintenance or Unit Level Logistics Systems action. This data is tracked by the bumper number of the vehicle, date, DODAAC, and the Unit Identification Code (UIC). This data includes troubleshooting information that is date and time stamped, a maintenance action log, test results, fault isolation data, and repair parts data. The collection of this data will lead to the development of prognostic data. This data coupled with the trend analysis, the operating environment provided by the user, and data received from ULLS will provide analysis which lead to fault prediction.

The FAMPS, in conjunction with IEDRM technology, will combine maintenance management functions and procedures into an automated system that can lead soldier maintainers into the XXI Century. This process will eliminate redundant processes and reduce man-hours, which will enhance wrench turning time. This technology will create an audit trail to justify maintenance actions/repair times and identify training shortfalls. FAMPS will provide single focal point for the automation of IEDRM functions, and the collection of maintenance data to predict the failure of components or systems. Additionally, FAMPS will provide communication capabilities to other agencies and interface with maintenance and supply management systems.

[SME indicated that FAMPS is software to be run on the CTS (or on a computer in a motor pool) to check engine health. It receives analog and digital inputs. It can connect both to a data bus, or to a Data Connector Assembly (DCA) used to receive analog inputs. FAMPS can be used for all vehicles except for the 2 1/2 ton truck and the M1 tank.]

### 3. DTLOMS Area.

- a. Primary: Materiel.
- b. Secondary: None.

### 4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Both.

Most combat track and wheeled systems are and will be modernized to include the on-board sensors (digital and/or analog). Sensor information will be digitized and fed into an expert system giving maintenance activities a predictive (Proactive) maintenance capability.

### 5. CSS BOS Function.

- a. Primary: Fix.
  - b. Secondary: Arm, Fuel, Man, Distribute, Sustainment Engineering.
- FAMPS will support any BOS function (Combat, CS or CSS) that uses vehicles.

### 6. FXXI Priority. High.

Per the Chief of Ordnance, 1997.

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. None.

[FAMPS was not listed in this Plan.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed.

9. The 1996 US Army Modernization Plan. Not Reviewed.

10. Prerequisite(s).

a. FXXI E/Is. CSS.

The CTS/SPORT are needed for FAMPS. The CTS then downloads the captured information into an expert system (Mission Maintenance data Base) maintained on another computer in the unit's motor pool.

b. Other prerequisites. None.

11. Overall risk status of

a. Prerequisite E/Is. Medium.

[The SPORT was assessed by CEFA as having an "Amber" wartime employment risk (determined by the SME as not having adequate wartime backup systems). SPORT's peacetime CEFA risk was "Green."]

b. Other prerequisites. N/A.

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. None.

Failure to field FAMPS will not have any adverse impacts on fielding/employment of the SPORT.

b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? None.

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? Specify.

The Multicapable Maintainer and any other maintenance items that relate to predictive/prognostic maintenance.

16. Supporting analytical studies. None.

[SME indicated that there are no military studies on the FAMPS. Also, he did not cite and studies performed on related FAMPS COTS technology that may have been performed in the civilian sector.]

17. Changes in manpower requirements caused by fielding this given CSS E/I. None.

18. Related changes in CSS efficiency. Increase.  
More efficient maintenance management.

19. Related changes in CSS effectiveness. Increase.  
More accuracy in maintenance prognosis, thereby allowing increases in system operational availability rates.

20. Related force structure (equipment and/or organizational) changes.

- a. In equipment (other than the equipment associated with the given CSS E/I itself). None.
- b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Developed.  
FAMPS Operational Concept is developed as part of the Chief of Ordnance's 1997 Maintenance Concept XXI. However, this concept has not yet been approved. The Maintenance Concept XXI is a part of the Ordnance Vision XXI which has been approved by the Chief of Ordnance.

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. No.  
No approved MNS yet.

b. ORD. No.  
Not yet.

c. BOIP. No  
Not yet.

23. CSS E/I training in TRADOC schools. No.  
Too early in FAMPS development cycle.

24. Examined in

- a. TF XXI AWE (Mar 97). No.
- b. TRAC's Div Design Analysis Study. No.

c. The Nov 97 DAWE. No.

25. Tested elsewhere. No.

Not tested yet. Plans call for initial testing in CY 98 at Ft Riley and/or the NTC.

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. No.

27. Planned BOIP (connectivity between FPs). Unknown.

To-Be-Determined. But it is likely that FAMPS software will be wherever we have the CTS/SPORT.

28. Technical capabilities. Unproven.

No list of technical capabilities required by FAMPS has yet to be developed other than generic requirements to be able to accurately predict engine status. However, related COTS technology has been proven in the civilian sector.

29. LIA's 15 elements of ILS assessment. Not Assessed.

Too early.

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). No.  
No fielding schedule even exists for FAMPS yet.

b. In time for the First Digitized Corps (2006). Unknown.

c. During FY 07-10. Unknown.

31. Overall Peacetime (Programmatic) risk. Red.

[Initially this study team and the SME thought that "Amber" was an appropriate response. However, given there are no approved requirements documents, no funding, and no completed Army testing, this study team now thinks that a "Red" rating is more appropriate.]

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.

[SME felt that since this will use COTS technology and software played on the SPORT, RAM failures would be unlikely. Also, the threat to FAMPS would be no different than the threat to any using unit.]

33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation. Low.

The SPORT CEFA assessed that the SPORT itself would have a "Low" likelihood of wartime degradation.

34. Wartime backup (BU) system. No real planned BU system for the FAMPS. Units could possibly using a FAMPS from another near by unit. Without FAMPS it would be "business as usual" with no predictive maintenance equipment for engines.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. Medium. Without FAMPS we might see lower system operational availability rates than with FAMPS. This could adversely affect the maintenance synergism needed to successfully execute the new FXXI Maintenance Concept in support of higher OP Tempo conditions. Also, absence of FAMPS could in some way detract from the overall planned capabilities expected of the FXXI Multicapable Maintainer.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. N/A.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Medium. Units without FAMPS would likely experience reduced system operational availability rates, and a reduction in maintenance situational awareness due to having no predictive maintenance capability.

38. Other adverse wartime impacts (e.g., scenario dependent). None.

39. Overall wartime risk associated with employment of this CSS E/I. Amber

[SME indicated an "Amber" response since we are reducing our dependency on CL IX stock piles due to BD, Velocity Management (VM) and Intransit Visibility (ITV). His position is that the Army is going to "just in time" logistics. Without predictive maintenance, there is some risk that we may not be able to fully have predictive supply. Also, from a synergistic point of view if FAMPS with no BU system, along with other maintenance FXXI enablers/initiatives, were to fail on the battlefield, then he felt that under a sustained conflict (high OPTEMPO) we would have some moderate risk to effective battlefield maintenance.]

40. Overall risk (considering both programmatic and wartime risks). Red.

[Refer to paragraph 31 peacetime risk rating and explanation.]

41. Ordinal ranking of this CSS E/I by the CSS DCDs.

42. Cardinal ranking of this CSS E/I by the CSS DCDs.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities.

44. Remarks. None.

45. Data Sources. CW4 Steele, CASCOM (DCD-Ord Dir), DSN: 687-0579.

1. Title. Finance Smart Card Interface

2. Designation. FXXI CSS Initiative.

*The Finance Smart Card Interface is envisioned as a software suite.* This software will be loaded on computers operating in a local area network or "stand alone" mode. The primary purpose of this initiative is to reduce clerical errors and administrative burden.

The following is a brief description some potential finance/SMART Card (MARC) programs.

a. Casual Pay-Software currently under development.

(1) Current System. In a deployed location the customer approaches a finance cashier and requests a casual payment. The finance cashier must manually complete a casual pay form, verify the customer's ID card information, obtain the customer's signature on the casual pay form and pay the soldier the requested amount. After the finance clerk has made all needed casual payments they must return to or mail the casual pay forms to a fixed site where they will be input into the Army's automated accounting system. Casual payments given during deployments create an administrative workload in addition to normal operations.

The average time required to process casual pay transactions often increases during deployments because of increased administrative burdens. In addition, mistakes caused by the increased workload often lead to late or inaccurate pay transactions. Late, inaccurate casual pay transactions during Operation Desert Shield/Desert Storm were contributing factors that caused the Army to forgive more than 53 million dollars in soldier debt.

(2) Smart Card. A customer approaches a finance cashier and requests a casual pay. The soldier inserts his/her card into a reader. The reader is attached to a stand alone lap top computer. The computer then displays the soldier's administrative data and casual pay history. After reviewing this data, the finance cashier determines the soldier's eligibility to receive a casual payment. If the soldier is eligible to receive a casual payment, the finance cashier enters the casual pay data into the computer and asks the soldier to enter their Personal Identification Number (PIN). If the soldier enters the correct PIN, the cashier pays the soldier and the system stores the casual pay data the MARC and the laptop computer's hard drive. Upon returning to the finance office location, the cashier will use a floppy disk to upload casual pay data into the accounting and military pay system.

Since the casual pay information is stored on the soldier's card it makes paper receipts optional. Storing the soldier's casual pay on the MARC will also reduce the soldier's ability to receive unauthorized multiple casual payments. By allowing for single source data entry of casual pay data this system will greatly reduce the administrative burden and clerical errors associated with deployments.



b. Deployment Pay-Software currently under development.

(1) Current System. Unit representative supplies their supporting finance units with a paper copy of deployment manifests. Finance personnel must manually type in the name, social security number and other administrative data required for each needed pay transaction. Customer service is often adversely affected during deployments due to an increased administrative burden. In addition, mistakes caused by the increased workload could lead to late or inaccurate pay transactions.

(2) Smart Card. A unit representative provides their supporting finance unit with an electronic deployment manifest created using a smart card manifest system. Finance personnel load the manifest into a program that instantly creates all needed transactions. This system will eliminate administrative errors and ensure timely entitlements.

c. Military Pay-Software currently under development.

(1) Current System. A service member fills out pay change requests or pay inquiries on paper forms for submission to their servicing finance unit. Finance personnel then manually input requested pay changes into DJMS. This process is labor intensive and creates an administrative burden on both the service member and finance personnel. This process is also highly prone to administrative errors resulting in slow service or inaccurate entitlements.

(2) Smart Card. A service member approaches a kiosk or designated computer with an ICC reader, and inserts his/her smart card. The card supplies positive verification of identity and all needed administrative data required for pay transactions or inquiries. Once their identity is verified, the service member may make any authorized pay transaction or pay inquiries. This eliminates many interim procedural steps (in process accuracy) and allows for rapid transmission of encoded transactions to the finance database.

d. Check Cashing-(Software) Unfunded.

(1) Current System. A service member approaches a cashier to cash a check. The cashier verifies the soldiers' personal data and cross checks that data against a "bad check list". Along with the "bad check list" service members often have their ID cards over stamped. This system is prone to failure if the soldier's card is not over stamped, if the paper bad check list is out of date or if the computerized bad check list is unavailable.

(2) Smart Card. Soldier's check cashing privileges are recorded electronically on the smart card. If the soldier has cashed a bad check, the system instantly updates their card during the check validation process. This system will speed the check cashing process, and improve bad check control.

e. Cash Collections-(Software) Unfunded.

(1) Current System. Prior to arriving at the cashier's location, customers must complete a cash collection voucher with many carbon copies. The cashier checks the voucher for administrative errors and the soldier pays their debt through a cash payment and receives a paper receipt. This data is then manually input into the finance accounting system. Mistakes during this process could lead to the inability to reconcile cash balances.

(2) Smart Card. Service members approach the servicing cashier and inserts their cards into a reader. Cash collection data is selected from a menu/template, appropriate accounting information is assigned to the transaction and all pertinent data is instantly recorded on the card. This eliminates the need for paper receipts. The cash collection information is then downloaded to the accounting system. These procedures would eliminate mistakes and speed cash reconciliation.

f. Stored Value- (Software) Unfunded.

(1) Current System. None, all point of sale transactions are completed via cash, check, or credit.

(2) Smart Card. Customer makes a purchase from an approved vendor for goods or services using their stored value smart card. After the soldier's identity is verified using a PIN, the card is automatically debited for the correct amount and the vendor instantly receives a credit. In addition to greatly reducing the amount of US currency in a theater of operations a stored value card would allow AAFES or other vendors to track point of sale information. This information could be used to detect buying patterns and possible black market activities. A stored value system would greatly reduce the economic impact of a deployment into an immature theater of operations by minimizing the amount of US dollars entering a theater of operations. Lastly by reducing the amount of cash in a soldier's possession smart cards have the potential to greatly reduce petty theft.

3. DTLOMS Area.

a. Primary: Materiel.

b. Secondary: Soldiers.

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Both.

5. CSS BOS Function.

a. Primary: Man.

b. Secondary: None.

6. FXXI Priority. Medium.

The Finance Smart Card Interface leverages both the Smart Card (which includes but is not limited to the "MARC" card) and the DFBS technologies.

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. None.

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed.

9. The 1996 US Army Modernization Plan. Not Reviewed.

10. Prerequisite(s).

a. FXXI E/Is. CSS.

A Smart Card (including but not limited to the "MARC" card) is essential for the Finance MARC Interface suite of software programs. The SMART Card technology will leverage DFBS' capabilities. Without a SMART Card, the maximum automation of repetitive financial management (DFBS) tasks will not be accomplished

[This study team therefore assumes that the MARC initiative (or whatever it evolves into-call that end stage some form of a "Smart" Card) will be the prerequisite FXXI CSS initiative for this given initiative.]

b. Other prerequisites. None.

11. Overall risk status of

a. Prerequisite E/Is. Medium.

[This study team was advised by the Finance School SME to use the CEFA risk rating submitted to me by the Project Manager/(TRADOC) proponent for the MARC (or Smart) Card. For purposes of this analysis, this study team will use the CEFA assessment for the AG School's MARC card. The MARC CEFA assessment rated MARC as "Amber" (Medium risk) due to the lack of sufficient funding.]

b. Other prerequisites. N/A.

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. None.

Without this Finance Smart Card Interface suite of software, the Smart Card technology will continue to evolve for other planned uses.

b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? None.

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? None.

16. Supporting analytical studies. None.

[SME could not provide any supporting studies that supported the Finance SMART Card Interface benefits.]

17. Changes in manpower requirements caused by fielding this given CSS E/I. None  
Based on SME-MJ, this initiative will have a negligible effect on manpower requirements.

18. Related changes in CSS efficiency. Increase.  
This initiative will further tighten fiscal controls, thus providing better accountability. Using the SMART card technology in this initiative to capture customer's administrative data will increase both the accuracy and timeliness of financial transactions.

[As quoted from CASCOM's 14 May 97 CEP resume Sheet: (a) "... (1) By utilizing Finance Smart Card technology's read and write capabilities, finance personnel can make maximum use of automation thus improving timelines and accuracy of transactions. (2) Finance Smart Card applications allow automated systems to positively identify soldiers and validate transactions through the use of a PIN (Personnel Identification Number). This feature will allow soldiers to directly access and make authorized changes to their pay accounts. (3) This system leverages initiatives outlined in the pay/personnel interface. (4) This system will provide a linkage to the DOD Objective Pay Personnel System", and (b) "... Utilization of the smart card will enable the automation of many repetitive tasks now being accomplished manually by finance personnel. Through the automation of repetitive tasks, the Finance corps can reduce the administrative burden of financial management requirements and minimize clerical errors. In order to support future joint operations, all developed applications will be designed to support the needs of all services."]

19. Related changes in CSS effectiveness. Increase.  
This initiative will increase effectiveness in two ways. First, using the SMART Card technology will reduce clerical errors when processing financial transactions. Second, an individual's transactions are stored on the SMART Card thus providing an accurate payment history. This increases the effectiveness of overall fiscal controls.

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself). None.

[The SME responded "None." However, he also responded "that the ADP requirements for the SMART Card Interface are minimal. The equipment required to run the software is any Windows-based computer and a \$170 SMART Card reader. This study team (a) assumes that the required computers are not a part of this initiative, (b) does not know the extent to which this initiative (1) will require the purchasing of new computers, or (2) will be run on existing computers located in Finance units, and (c) was advised that the funds the Finance School is pursuing are for "software development" and not for the SMART Card themselves. Therefore, this study team assumes that the Finance School is not pursuing funds for any extra computer requirements.]

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Not Developed.

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. Unknown.

[The SME responded with an answer relevant to only the SMART Card itself. Please refer to the MARC CEFA assessment for its MNS/ORD status. However, this study team does not know if a MNS/ORD is required for development of the software integral to the Financial SMART Card Interface suite of software.]

b. ORD. Unknown.

c. BOIP. Unknown.

23. CSS E/I training in TRADOC schools. No.

Currently there is no SMART Card instruction being conducted at the Finance School. If their test of this initiative is successful, then such training will begin as required.

24. Examined in

a. TF XXI AWE (Mar 97). No.

b. TRAC's Div Design Analysis Study. No.

c. The Nov 97 DAWE. No.

25. Tested elsewhere. No.

However, the Finance School intends to test this initiative with the 25th ID.

[Also, as of 14 May 97 the Finance School is pursuing funding for the development and testing of Finance SMART Card applications through the Concept Experimentation Program (CEP).]

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. N/A. Funding in the POM is not required. Total funding for development and fielding is less than \$200,000. Currently, the Finance School is pursuing alternate funding sources through CEP, DFAS and other means.

[This study team does not know the extent to which new computers, if any, and the requisite MARC card readers are budgeted in support of this initiative. Please refer to paragraph 20a.]

27. Planned BOIP (connectivity between FPs). Yes.  
Plans call for fielding this initiative to all four FPs.

28. Technical capabilities. Proven.  
The Army has working prototypes of this initiative.

29. LIA's 15 elements of ILS assessment. Unknown.

[This study team thinks that it is unlikely that the LIA has to date conducted any ILS assessment relevant to this initiative. Such may not even be appropriate for a "software suite."]

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). Unknown.

[SME indicated that the fielding of the Finance SMART Card initiative is dependent on the fielding of the MARC (or SMART Card). The MARC CEFA assessment indicated that it is "Unknown" if the MARC card will be fielded by FY 2000. Therefore, this study team assigned a response of "Unknown" to this answer.]

b. In time for the First Digitized Corps (2006). Unknown.

[Refer to above.]

c. During FY 07-10. Unknown.

[The Finance School SME responded "Not Scheduled" for this question. However, based on the two previous "Unknowns", this study team elected to also assign an "Unknown" for this question.]

31. Overall Peacetime (Programmatic) risk. Amber.

[SME rated this response as "Green/Amber" due to funding concerns." Coupling this with the peacetime risk (Amber due to lack of adequate funding) for the stated MARC prerequisite, with the fact that an Operational Concept is not yet developed, and the lack of Army testing, this study team therefore assigned an "Amber" to this question. This assignment of "Amber" does not however address the issue of purchasing, if required, any supporting computer equipment which may not be budgeted. This study team would have assigned a "Red" except for the fact that this initiative's technical capabilities have been proven and that the required funding is low.]

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.

The main threat is from computer viruses destroying the program disks.

33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation. Low.

[Refer to the MARC CEFA assessment.]

34. Wartime backup (BU) system. Manual BU systems will always be available.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. N/A.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. Medium.

Manual BU systems would seriously degrade unit (finance) efficiencies and effectiveness. The BU systems would tend to be slower and lead to clerical errors.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Medium. Decreased interoperability between FPs. Slower transaction processing times for those units not having received this initiative. However, plans call for fielding this initiative to all four FPs.

38. Other adverse wartime impacts (e.g., scenario dependent). None.

39. Overall wartime risk associated with employment of this CSS E/I. Green.

40. Overall risk (considering both programmatic and wartime risks). Amber.

[Refer to paragraph 31 above.]

41. Ordinal ranking of this CSS E/I by the CSS DCDs.

42. Cardinal ranking of this CSS E/I by the CSS DCDs.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities. N/A.

[This initiative was not listed in this Plan.]

44. Remarks. None

45. Data Sources. CPT Jeffrey Powell, US Army Finance School, DSN: 734-8616.  
CASCOM's 14 May 97 CEP Resume Sheet for the Finance Smart Card Technology applications.



1. Title. Force Manning System (FMS) Module in CSSCS.

2. Designation. FXXI CSS Initiative.

a. Description: The Force XXI Manning System (FMS) Module in CSSCS is a windows-based personnel accounting system

"designed as a prototype of the desired personnel functionality within the CSSCS. "

FMS provides the S1 and G1 with tools for real-time personnel estimates, predictive planning, accurate deployed database, unit strength, and mission analysis. FMS provides the S1 the capability to absorb information from the Command and Control information system and significantly reduce the unit's 1SG workload.

b. Characteristics:

(1) The "prototype" FMS is a windows-based applications software with a relational database that provides graphical user interface (GUI). FMS operates on a laptop personal computer that requires a minimum of 8 MB of RAM. FMS interfaces with the Multi-technology Automated Reader Card (MARC) and Appliqué. Planned interface with Army Component Information System (ARCIS), Standard Installation/Division Personnel System (SIDPERS), and Total Army Personnel Data Base (TAPDB). Planned integration into CSSCS during FY 98.

(2) Per AG School SME: " The Personnel Services Support Control System (PSSCS) is a confederation of FMS, the MARC card, and the Personnel Situation report (PERSITREP) from Applique. ... FMS is only a "prototype" of the personnel functionality desired within CSSCS. CSSCS already has a personnel module, but it lacks detail, and does not go down to Social Security number, as is needed at battalion and brigade level for personnel lists. Our goal is for FMS to become the personnel functionality for CSSCS. So- FMS is not hardware, nor a separate system of any kind. We have no BOIP, it's CSSCS's BOIP. We are not approved in the POM, nor extended POM."

c. Requirements/Need/Mission: The Personnel Service Support (PSS) vision is to provide the PSS operator the ability to maintain tempo equal to or greater than the supported combat forces. FMS provides accurate, useful and timely information to the tactical commander. The commander requires accurate personnel readiness information to select the best course of action for successful mission accomplishment. We will achieve the PSS vision through robust digitized systems that interface with tactical, combat service support, operational and strategic systems. This will give the S1 and G1 near real-time visibility of combat power. CSSCS must integrate the elements of combat power (Manning, Arming, Fixing, Fueling, Maintaining and Sustainment) into a graphics user interface display.

3. DTLOMS Area.

a. Primary: Materiel.

b. Secondary: None.

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Both  
FMS is modernizing the strength reporting process through the use of state of the art computers.

5. CSS BOS Function.

a. Primary: Man.

b. Secondary: None.

6. FXXI Priority. High.

Based on TRADOC Pamphlet 525-5, Force XXI Operations.

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. High.

[CSSCS was a part of CSS C4 which was rated #1 out of 51 priorities. CSSCS itself was rated #3 out of 5 CASCOM HQ priorities. FMS by itself was not mentioned. But since it is a planned sub-module of the CSSCS, this study team assigned a "High."]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Briefed.

[CSSCS was in fact briefed. Briefing charts (a) indicated that CSSCS was "Green" for money in the POM or programmed to be in the POM for the "First Division Equivalent" by FY 2000 or before, and (b) recommended an additional \$9M in funding by FY 03 and an additional \$17M by FY 06.]

9. The 1996 US Army Modernization Plan. Reviewed.

[The Army Mod Plan (page I-5) reviewed the CSSCS and rated it for the near-term (FY 96-98) and the mid-term (FY 99-01) as Amber "due to extended procurement duration. The plan then goes on to read:" ... Reduced procurement slows the conversion to integrated, automated decision-making capabilities, and causes combat service support commanders in Force Packages 2 and 3, Army National Guard (NG) and US Army Reserve (USAR) units to use less efficient, slower, manual information management tools. Programs for the far-term (FY 02-11) will increase procurement, hence the Green rating (assigned by the plan for FY (02-11).]

10. Prerequisite(s).

a. FXXI E/Is. CSS.

FMS is to be the personnel sub-module of the CSSCS. Therefore, existence of the planned "FMS" requires CSSCS.

b. Other prerequisites. None.

11. Overall risk status of

a. Prerequisite E/Is. Low.

[FMS is a part of the CSSCS. The CEFA indicated that CSSCS has an overall risk status of Green. However, this study team could not specifically determine as a part of the CSSCS CEFA if the FMS system design and programming were completely funded/tested in CSSCS. The CSSCS CASCOS SME did, however, estimate the CSSCS "system" as having a Green programmatic risk and Green wartime risk.]

b. Other prerequisites. N/A.

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. None.  
However, the current CSSCS personnel sub-module is not at the social security number level of detail and therefore can not support certain personnel inquiries. So, if FMS is not fielded, CSSCS will be forced to operate with a less efficient personnel sub-module.

b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? None.

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? Specify.  
The personnel situation report (PERSITREP) of the FBCB2 FXXI CSS Initiative can benefit from FMS (as more detailed information will be available from CSSCS to input into the FBCB2).

16. Supporting analytical studies. Yes.

[The AG School SME advised that no COEA-type studies or economic analyses have been performed on FMS. He indicated that he would research the existence of supporting studies and advise this analyst. To date no reply has been received from the AG School SME on this issue of existing studies supporting any increases in efficiencies/effectiveness due to FMS.

However, the Soldier Support Institute (SSI) conducted a PSS Simulation Exercise (PSS SIMEX) in Aug 96 using the Battalion/Brigade Simulation (BBS) as the exercise driver. This SIMEX was used to train AG school students in PSS concepts and to evaluate PSS principles of support under simulated combat conditions. The Director, TRAC-LEE, coordinated with SSI for participation of an observer team in the exercise to collect data and observations as the basis for analysis of FXXI PSS issues. The purpose of the TRAC analysis was to gain insights on PSS initiatives and technological enablers. The specific focus of the analysis was on the redesigned FXXI PSS Automated Manning Process, the FMS, as well as the related impacts on medical, financial, and chaplain services.

a. Table 2 , page 6 of the TRAC-LEE Jan 97 final study report ( # TRAC-TR-0297) lists PSS SIMEX insights considered strengths of FMS. To cite a few here: "(1) The overall design and implementation of FMS enhances the ability of the PSS operator to maintain the Operational Tempo (OPTEMPO) with that of the warfighter, a key objective, and (2) The capability of the PSS operator to provide useful, timely, and accurate support to the combat commander is significantly increased." (other such insights are also listed in this Table 2.)

b. Table 3, page 7 of the cited report lists insights considered to be candidates for improvement. To cite a few here: (1) Personnel replacement packages based on predictive manning methods were often at variance with unit replacements at the MOS level of detail, and (2) Manual augmentation to the digitized PSS environment ranging from moderate to a great deal was necessary to manage/execute various PSS tasks." (other such insights are also listed in this Table 3.)

c. Selected TRAC study conclusions follow: (1) "...7a(2) The absence of some FMS functionality within BBS (reporting/query capabilities, situational awareness between division and brigade) limits the training and concept evaluation value of some aspects of the BBS SIMEX. (Note: the SIMEX controllers/administrators acknowledged that the full functionality of FMS, particularly as related to reporting and ad hoc query capabilities, was not represented in the BBS simulation. Therefore, these results are at best a reflection of the limitations of BBS and not FMS..." , and (2) "...7a(6) Only general insights should be drawn from this initial effort due to the small size of the survey sample."]

17. Changes in manpower requirements caused by fielding this given CSS E/I. None

[This study team was advised by an AG School representative that there would be no reduction in manpower requirements caused by fielding the FMS. Such manpower reductions have already been taken in the AOE force with the implementation of the SIDPERS Version 3.0.]

18. Related changes in CSS efficiency. Increase.

[The AG School SME advised this analyst that such answer was based on his subjective MJ and his expectation of FMS providing the CSSCS with social security number level of detail. However, he said that there were no analytical studies supporting any increases in efficiencies/effectiveness caused by fielding the FMS. He indicate that he would research the existence of supporting studies and advise this analyst. To date no reply has been received on this issue of existing studies supporting any increases in efficiencies due to FMS.]

19. Related changes in CSS effectiveness. Increase.

[The AG School SME advised this analyst that such answer was based on his subjective MJ and his expectation of FMS providing the CSSCS with social security number level of detail. However, he said that there were no analytical studies supporting any increases in efficiencies/effectiveness caused by fielding the FMS. He indicated that he would research the existence of supporting studies and advise this analyst. To date no reply has been received on this issue of existing studies supporting any increases in effectiveness due to FMS.]

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself). None. FMS will be a part of the CSSCS.

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. N/A.

FMS will be contained in the Operational Concept of the CSSCS.

[AG School does have an "experimental level" type concept plan for the TF XXI AWE and has drafted one for the upcoming Nov 97 Division AWE.]

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. Yes

FMS is included as a part of the CSSCS.

[Based on the SME's above response, this study team assigned a "Yes." Refer to the CSSCS FEFA assessment.]

b. ORD. Yes

FMS is included as a part of the CSSCS.

[Based on the SME's above response, this study team assigned a "Yes."]

c. BOIP. Yes

FMS is included as a part of the CSSCS. Its BASIS OF ISSUE/TOTAL REQUIREMENT is based on the CSSCS BOIP: Battalion S-1 and above.

[Based on the SME's above response, this study team assigned a "Yes."]

23. CSS E/I training in TRADOC schools. Yes.

The FMS Program Of Instruction (POI) is now (as of 5 May 97) disseminated only within the AG School to the following courses: the Basic and Advance NCO courses, and the AG and Warrant Officer Basic and Advanced courses. The AG School has also developed a "Tactics, Techniques and Procedures (TTP) & User's Manual" for the FMS (CSSCS).

24. Examined in

a. TF XXI AWE (Mar 97). Yes

[The AG School SME indicated that the FMS was to be evaluated at the Mar 97 TF XXI AWE. No official OPTEC report on the TF XXI has been released as of this writing. However, in a 23 Apr

97 CDR CASCOM briefing to the Command and General Officer Staff College (C&GSC), Ft Leavenworth, one briefing chart indicates that: "...CSSCS (Insights): CSSCS provided maneuver commanders with critical logistical situational awareness...enabling him to make key decisions." However, this study team has no information to indicate if "logistical" perhaps also includes personnel information from the FMS. Former CASCOM CDRs have sometimes used the word "Logistics" to also include personnel and medical.]

b. TRAC's Div Design Analysis Study: No.

c. The Nov 97 DAWE. Yes.

25. Tested elsewhere. Yes

[One AG School SME indicated that the FMS had been previously tested at Ft Lewis and Ft Hood with test results available. To date this analyst has not received these test results. Another AG School SME indicated that the FMS had been tested at Ft Irwin (at an NTC rotation in Jul 96), but no test results were available. Also, (a) the FMS was reviewed in an Aug 96 PSS SIMEX conducted by the AG School. Results are discussed above in paragraph 16, and (2) the CSSCS was tested at a Ft Hood IOTE II in Dec 96. However, AG School input indicated that the FMS will be resident "no later than" 30 Jun 97 on the CSSCS platform; with FMS being "fully integrated into the CSSCS" around FY 98. This study team does not know the extent to which the new FMS was examined as part of this Dec 96 CSSCS IOTE II.]

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. Unknown.

[The AG School SME indicated that CSSCS funding would also include FMS requirements. Lack of CEFA study resources precluded complete resolution/verification of this issue.]

27. Planned BOIP (connectivity between FPs). Yes.

[AG School CEFA input listed "See CSSCS" as the response here. This study team refers readers to paragraph 27 of the CSSCS CEFA: "...There will be connectivity between all four FPs (for CSSCS). Per the CSSCS SME- (a) there is an Oct 94 approved BOIP of 19 CSSCS per Div for all 10 Division, (b) plans call for fielding CSSCS also to the 15 Enhanced Readiness BDEs, and (c) when CSSCS is fielded to a parent active duty unit, at that time CSSCS will also then be fielded to aligned USAR/NG units." However, this study team does not know the extent/scheduling of the planned upgrades (read "FMS") to the existing CSSCS personnel module.]

28. Technical capabilities. Proven.

29. LIA's 15 elements of ILS assessment. N/A.

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). Yes.

[AG School CEFA input indicated that the FMS would be fielded under the same fielding plan as for the CSSCS. Please refer to the CSSCS CEFA. This indicates that the CSSCS would be fielded to the First Digitized Division (if to be the 4th ID) in FY 97/98. Also, as mentioned above the AG School input indicated that the FMS will be resident "no later than" 30 Jun 97 on the CSSCS platform; with FMS being "fully integrated into the CSSCS" around FY 98.]

b. In time for the First Digitized Corps (2006). Yes.

[AG School CEFA input indicated that the FMS would be fielded under the same fielding plan as for the CSSCS. Please refer to the CSSCS CEFA. This indicates that the CSSCS would be fielded to the First Digitized Corps (if III Corps) in FY 97/98.]

c. During FY 07-10. Yes.

[AG School CEFA input indicated that the FMS would be fielded under the same fielding plan as for the CSSCS. Please refer then to the CEFA CSSCS Assessment. This indicated that the CSSCS fielding would continue until completed in FY 08.]

31. Overall Peacetime (Programmatic) risk. Green.

[AG School response: "FMS is 100% dependent on the programmatic risk associated with the CSSCS."]

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.

[Again, FMS is a sub-module of the CSSCS. Therefore, please refer to paragraph 32 of the CSSCS CEFA.]

33. Likelihood of prerequisite C,CS or CSS E/I wartime degradation. Medium.

[Refer to paragraph 32 of the CSSCS CEFA assessment.]

34. Wartime backup (BU) system. There always will be the manual "stubby pencil" BU system for FMS. No other automated FMS BU system is planned.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. N/A.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. Medium.

Personnel information provided to the battlefield commander would be degraded and not meet the time requirements envisioned for modern FXXI operations.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Medium.

For a MRC we would need to have two different battlefield personnel C2 systems. Managing and integrating two such different systems at the FXXI Corps level would impose unacceptable inefficiencies and degrade the overall effectiveness of the battlefield personnel replacement system.

38. Other adverse wartime impacts (e.g., scenario dependent). None.

39. Overall wartime risk associated with employment of this CSS E/I. Amber.

[AG School SME based this wartime Amber risk on the fact that since no automated BU personnel system is being planned, any unexpected reversal to a manual BU personnel system during intense FXXI operations would cause moderate impacts to field commanders.]

40. Overall risk (considering both programmatic and wartime risks). Amber.  
Due to the Amber wartime risk assessment.

41. Ordinal ranking of this CSS E/I by the CSS DCDs.

42. Cardinal ranking of this CSS E/I by the CSS DCDs.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities.

44. Remarks. None. AG School input indicated that the FMS will be resident "no later than" 30 Jun 97 on the CSSCS platform; with FMS being "fully integrated into the CSSCS" around FY 98. This study team does not know the extent to which the new FMS was examined as part of this CSSCS IOTE II.]

45. Data Sources. AG School SMEs: (a) Primary- M. Doug Snyder, DSN: 734-8350, and (b) Secondary- Mr. Jim Parker, DSN: 734- 8336. CASCOM Sep 96 CSSMMP and related May 97 updates.



1. Title. Force XXI Battle Command, Brigade and Below (FBCB2)-Combat Service Support (CSS) Functionality

2 Designation. FXXI CSS Initiative.

a. Description: FBCB2 is a sub-element and a key component of the ABCS. FBCB2, as a key component of the ABCS, interfaces with the Army Tactical Command and Control Systems (ATCCS) located within the Brigade and Battalion. FBCB2 is a digital, battle command information system that provides mounted/dismounted tactical combat, combat support and combat service support commanders, leaders and soldiers integrated, on-the-move, real-time/near-real time, battle command information and situational awareness from brigade down to the soldier/platform level across all Battlefield Functional Areas (BFAs). FBCB2 is located in the mounted and dismounted maneuver (divisional, separate, heavy and light) cavalry/reconnaissance, and armored cavalry, mechanized infantry, infantry and aviation units. FBCB2 integrates with ATCCS located within the Brigade and Battalion. These combined arms units report to the divisional headquarters or joint/combined command authority and habitually have the CS/CSS slice normally provided from division/corps. Commanders and leaders rely upon ABCS functional area systems, AGCCS, FBCB2, and the WIN to maintain a common operations picture across all BAS while performing missions throughout the operational continuum. ABCS combines mission applications with common applications and support software, DOD mandated Defense Information Infrastructure (DII) Common Operating Environment (COE) products, protocols, and common hardware, in accordance with the Army Technical Architecture (ATA) Framework for Information Management. FBCB2 integrates emerging and existing communication, weapon, and sensor systems to facilitate automated status, positional, situational, and combat awareness reporting.

Type of System Proposed. FBCB2, a battle command information system, shall provide the technology to complete the ABCS information flow process from brigade to platform and across all platforms within the brigade task force. Additionally, FBCB2 will provide commanders the ability to remotely operate and maintain ABCS database connectivity regardless of command vehicle, and to digitally control and monitor their subordinate units status and position.

Operational Concept. Operational tempo, space, and time define battle space. FBCB2 improves the capability to operate in these dimensions by providing improved command and control while on-the-move by receiving and updating the ABCS common battlefield picture/situational awareness via horizontal and vertical linkages between TOCs and horizontal and vertical links between mounted and dismounted platforms. This in turn should reduce fratricide and enhance synchronization of maneuver, direct/indirect fires, intelligence and targeting.

(1) The mission of tactical units at brigade and below is to close with the enemy by means of fire and maneuver, to destroy or capture him, or to repel his assault. It supports the tenets of Army operations: initiative, agility, synchronization, depth, and versatility. FBCB2 enhances total force effectiveness by providing automated tools to facilitate the battle command process. It enhances the ability to operate in an unpredictable and changing environment throughout the battle space from stability and support operations through war. It allows forces to plan, execute, and recover from operations and synchronize all of the operating systems at a tempo that cannot be matched by the enemy.

(2) Timeliness, accuracy, and completeness of relevant tactical and operational information are key. FBCB2 provides leaders/commanders, shooters, and supporters software applications capable of selecting, managing, and assimilating relevant data and information. Incorporation of state-of-the-art information technology to include space-based systems into battle command allows commanders to concentrate effects rather than forces, enabling units to be both more survivable and more lethal. It affords combat forces the capability to retain the tactical and operational initiative under all mission, enemy, terrain, troops, and time available conditions despite an accelerated tempo which demands faster decisions, real/near-real time communications and response.

(3) FBCB2 supports the Force XXI concept through the integration and assimilation of information age technology. FBCB2 enables more effective use of available combat power by exploiting high-speed streams of information transmitted over tactical communications. FBCB2 shall necessitate a reevaluation of organizational design concepts for how to train for, plan, and execute future military operations.

b. FBCB2 CSS Functions:

(1) CSS functionality on FBCB2 gives the combatant a relevant picture of the current CSS situation at his/her echelon of command and at subordinate levels. It also provides the personnel and logistics leaders CSS situational awareness throughout their battle space as well as an enhanced capability to synchronize support to customer units. Current CSS functionality on FBCB2 includes logistics situational reports, personnel situational reports, situational awareness, call for support and logistics task order messaging, and task management capabilities. These capabilities are discussed below.

(2) Currently, FBCB2 permits information to be entered using pre-assigned menus used with a mouse device, and use of some free text, such as comments and other pertinent CSS information. Ideally, automated systems should be designed to limit free text input. FBCB2 is rapidly moving in that direction. Explained below are some of the key CSS functions contained in FBCB2. These requirements will continue to evolve with Force XXI doctrine and force structure.

(a) Logistics SITREP (LOGSITREP): The LOGSITREP provides unit commanders and key leaders with visibility of the latest logistics status for their units. More importantly, CSS leaders can anticipate requirements because he shares the same common logistics picture as the supported commander and staff. This automated logistics status is submitted from platform level through echelons of command to brigade headquarters. As with traditional situational reporting, FBCB2 allows information to be summarized or rolled-up at each command level before being forwarded to the next higher command. The LOGSITREP report includes roll-ups of Class I, III(P, B), IV, V, VII, VIII. The LOGSITREP will also have a comment field for pertinent commander comments.

(b) Personnel Situation Report (PERSITREP): FBCB2 transmits personnel strength information through the PERSITREP. The PERSITREP is a CSS report submitted from platform level through the command hierarchy to brigade headquarters level. FBCB2 users at platform level submit duty status changes through their first sergeants. The first sergeant forwards these changes simultaneously to the battalion and brigade S1. The first sergeant can also initiate duty status changes. The S1s will update the duty status changes from FBCB2 into the deployed personnel database contained within the personnel module of the CSSCS.

(c) Situational Awareness: Situational awareness for FBCB2 is defined as the timely, accurate situational data and enhanced graphic/visual presentation that provide "near-real time" awareness of the changing situation. Situational data is presented in the form of icons overlaid on a digital map using standard military symbology in accordance with FM 101-5-1 (Operational Terms and Symbols). Situational awareness is provided through the display of information derived from several messages. The FBCB2 provides the ability to select and display graphic overlays developed within the brigade combat team (BCT). Information such as the location of friendly units, logistical supply points and status, enemy location, and battlefield conditions are examples of information provided through situational awareness.

(d) Call for Support and Logistics Task Orders: Any platform with an FBCB2 can request CSS support through the Call for Support function. This message is designed for emergency or non-routine support requirements. The call for support is entered as a templated message and can be sent directly to the logistics organization that will provide the service or support. This function enables immediate support action on the battlefield--a combat multiplier.

(e) Task Management: The task management function gives the user the capability to track all tasks received, task sent, and completed tasks. It also provides the ability to track the status of all active tasks.

(f) Supply Point Status Report. The Supply Point Status Report (SPSR) enhances CSS customer synchronization and contributes to the common picture of the battlefield by depicting where supply points are located (icon on screen), specifically which critical supply items are contained in those supply points, and supply point opening and closing times.

### 3. DTLOMS Area.

#### a. Primary: Materiel.

FBCB2 is a new materiel system that is not replacing any system currently in the force. As a new system it will provide automated solutions to many of the routine tasks now accomplished in CSS.

#### b. Secondary: Doctrine.

Doctrine for employing the FBCB2 in CSS units is evolving to rely more heavily on the increased information available from the automated system. Predictive logistics and "just in time supply" are critically dependent on timely and accurate situational awareness and platform logistics status to meet the needs of the future force.

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Both.

FBCB2 is the lead digitization effort for command and control at the brigade and below. The CSS functionality automates many of the information management processes in logistics that are today done by stubby pencil.

5. CSS BOS Function.

a. Primary: Arm, Fuel, Fix, Man, Distribute, Sustainment Engineering.

FBCB2 is planned to augment all CSS BOS functions to include Arm, Fuel, Fix, Man, Distribute and Sustainment Engineering. Some functions are more developed at this time, but the objective system will support digitization in all disciplines.

b. Secondary: None.

6. FXXI Priority. High.

CSS functionality on FBCB2 is and will continue to be a high priority. FBCB2 is currently listed as a Warfighter Rapid Acquisition Program (WRAP) system.

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. Medium

[This study team reviewed the 4 Sep 96 CASCOM CSSMMP, and "Appliqué CSS" is discussed under the heading of a TIGER initiative. This Tiger initiative is ranked 28 out of 51 items (and 13 out of 21 Ordnance items) in Annex G (Prioritized Needs) of this Plan. The TIGER initiative is just one of the many programs intended to enhance the future capabilities of FBCB2 (CSS Appliqué). Therefore, this study team assigned a "Medium" to this response.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed

[No CASCOM provided response. However, this study team reviewed the 31 Jan 97 HQ TRADOC briefing charts for the Logistics Recommendations and could not find FBCB2 listed as a recommendation for additional funding.]

9. The 1996 US Army Modernization Plan. Not Reviewed.

[This study team could not find FBCB2 (CSS Appliqué) reviewed in this Plan.]

10. Prerequisite(s).

a. FXXI E/Is. CSS

(1) ATCCS, specifically CSSCS. The interface

between CSSCS and FBCB2 is important to the flow of information on the battlefield. Without CSSCS, the logistics information gathered below Battalion and Brigade level will become obsolete, long before it can be acted upon. Automated C2 at Brigade and above is critical to the continuous flow of logistics. (2) Also, the objective FBCB2 system User Functional Description (UFD) calls for interface with the Movement Tracking System, the Force XXI Manning System, the future

Medical System, Radio Frequency Tags, and Automotive Digital Diagnostics and Prognostics. These enablers are in varying stages of development and continue to exchange information with FBCB2. They have no significant impact on the near term FBCB2 development, but must work closely with the PM and TSM to assure future functionality.

b. Other prerequisites. CS

WIN (Tactical Internet). Without the communications to support timely delivery of the digital CSS traffic, we might as well keep the manual systems we have today. Many do not like the term "assured communications" but this probably explains it the best as we cannot use intermittent, piece meal message traffic.

11. Overall risk status of

a. Prerequisite E/Is.

(1) Medium.

The risk of CSSCS not being available is low to moderate. The CSSCS recently received Milestone Decision Authority to proceed with fielding. The CSSCS to FBCB2 User Interface Requirements Documentation was completed in June 1997 and passed to the PM CSSCS for action. No plan currently exists.

(2) Unknown.

CSS functionalities/applications are currently being worked with the TSM, Force XXI at Ft Knox and the PM, FBCB2. Further development required before the true risks can be identified. Place holders or planning wedges are being built into the overall FBCB2 plan to accommodate these future enablers.

b. Other prerequisites. High

The risk for the Tactical Internet is very high. The technical limitations of range and digital data transfer, coupled with the fiscal constraints, could possibly contribute to slow development. Also, the testing of the Tactical Internet is only planned for a Limited User test in August 1998, and a Full up test in 1999.

12. Adverse programmatic (peacetime) risks on:

a. The "prerequisite" E/Is affected if this given CSS E/I is not fielded. None

b. The other prerequisites. Unknown.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? Specify.

[a. The SME responded "None. The CSSCS does not require logistical information from FBCB2 for the Situational Awareness (SA) for EAC commanders and below. However, CSSCS and other Enablers will use information provided by FBCB2 to augment their own current data bases."

b. However, the CEFA SACIMS SME responded that SCAIMS requires FBCB2-CSS Functionality (refer to paragraph 10a of the SACIMS CEFA assessment. Therefore, this study team adjusted the FBCB2-CSS response accordingly.]

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. High  
Major impact; the FBCB2 is the only combat system employed at the soldier's level that will provide leaders/commanders real/near time information on logistical awareness. CSS Enablers are in support of the soldiers to conduct their mission with readily available information, whereas, the other CSS Initiative (CSSCS) is a tool primarily for commanders(Brigade and above). Therefore, if the FBCB2 were not fielded, it would have a major impact on the CSSCS initiative.

[Since the SME indicated above in the response for paragraph 13 that no other items (and especially the CSSCS) depend on (read "require") the FBCBS-CSS Functionality, then this study team would have expected an answer such as "N/A." The study team elected to leave the SME-provided "High" response until this is resolved.]

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? None

[CASCOM SME provided no response to this question. Therefore, this study team assigned a "None."]

16. Supporting analytical studies. None.

Cost analysis for CSS applications are not yet done. The CSS cost analysis will be done after MS I/II on 25 July 1997. However, AOA (Analysis of Alternatives) will address FBCB2 CSS effectiveness and efficiency after MSI/II.

17. Changes in manpower requirements caused by fielding this given CSS E/I. Unknown.  
Prescribed MANPRINT analysis will be performed to assess the allocation of functional tasks and the impact upon soldiers, hardware and software. However, there is no increase in cognitive or physical requirements for operators, maintainers, and supporters.

[SME did not address actual changes in manpower "requirements." Thus, this study team assigned an "Unknown."]

18. Related changes in CSS efficiency. Increase.

Yes, the increased Situational Awareness, will provide quicker and more accurate information for CSS personnel and commanders. Additionally the effectiveness of CSS planning will be enhanced greatly for the combat commanders; as well as, the operational combat effectiveness.

19. Related changes in CSS effectiveness. Increase.

Theoretically, supplies will be in the right place, at the right time, in the right quantities. CSS will become more effective by eliminating forward stockpiles of unneeded supplies.

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I

itself). None.

CSS functionality does not affect the current Force Structure (increase or decrease). CSS applications will be embedded on the FBCB2 hardware, which will be included within the PM fielding plan. CSS shall be applicable to the individual soldier, wheel and track platforms, and application for aviation platforms organic to these force structures.

b. In organization. None.

The parallel efforts of the Division Redesign, to include the Forward Support Company, are complimentary to the FBCB2. However neither system is truly dependent on the other.

21. Status of CSS E/I Operational Concept. Not Developed.

Not fully developed. Operational concepts are still evolving and emerging as a result of the TF XXI efforts in March 1997. The User Functional Description also addresses many of the operational features of FBCB2 CSS.

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. Yes.

The MNS is approved and included in the 1 Apr 97 UFD to include the 7 Mar 95 Joint Required Operational Capabilities (JROC).

b. ORD. Yes

The most recent ORD dated 21 July 97 is approved.

c. BOIP. No.

The BOIP is in draft and has not been released for staffing.

23. CSS E/I training in TRADOC schools. Unknown.

24. Examined in

a. TF XXI AWE (Mar 97). Yes.

During the TF XXI AWE conducted in March 1997 at NTC, the Logistics Report (LOGSITREP) was used over the New equipment Training (NET). The results showed the LOGSITREP was too bulky and cumbersome and competed with getting data through the Tactical Internet (TI). As a result, LOGSITREP has been enhanced for efficiency and provided to the PM Appliqué for the next software version.

[(1) On 23 Apr 97 CDR CASCOM briefed the C&GSC on the TF XXI AWE results. Briefing charts list "Appliqué" as one of the CSS Initiatives examined at the TF XXI AWE. Charts read "Appliqué... insights. Situational awareness a real winner. Enabled all commanders to know the location of friendly and opposing forces. First time, totally integrated all battlefield functions at the Brigade and below level."

(2) On 9 Jun 97 CASCOM briefed BG Dayan (Israeli Army) on the TF XXI AWE results. Charts indicated that the CSS Initiative "Appliqué" was examined at the AWE. Briefing charts read

"...Much difficulty in sending CSS messages due to maturity of the tactical internet-hindered ability to demonstrate anticipatory logistics. Digits do not equate to discipline--CSS reporting still required. CSS platforms included in Army's fielding."

(3) On/about 14 Apr 97 CASCOM briefed Congressman Sisisky on the TF XXI AWE results. Briefing charts indicate "...Only 56% of the units submitted LOGSITREPS. Of those submitted, only 18% were done digitally."

(4) TRAC-LEE's May 97 Emerging Results briefing charts for the CSS Analysis of TF XXI AWE indicate "...Appliqué...CSS commanders liked the situational awareness. Appliqué was not a major contributor in CSS operations-few messages passed via appliqué. CSS digitization did not increase the maneuver commander's confidence in logistic support. Appliqué use decreased over the course of the AWE."]

b .TRAC's Div Design Analysis Study. No.

c. The Nov 97 DAWE. No.

FBCB2 is not schedule to be used during the Div AWE at Fort Hood, TX., in Nov 97 or scheduled to be tested elsewhere, excepted during the scheduled Limited User Test and Evaluation (LUT&E) in Aug 98.

25. Tested elsewhere. Unknown.

FBCB2 and the Tactical Internet have been involved in various developmental tests, but none have specifically tested the CSS functionality.

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. Yes.

Required funding has been identified and programmed to perfect the system and field the First Digitized Division by the end of 1999.

27. Planned BOIP (connectivity between FPs). Unknown.

28. Technical capabilities. Unproven.

[SME responded "Unknown." However, the intent of this question was to ascertain whether or not the technical capabilities of this initiative have been proven, are unproven, or if the SME did not know ("Unknown"). Given the response to paragraph 25 above ("...FBCB2 and the Tactical Internet have been involved in various developmental tests, but none have specifically tested the CSS functionality."), this study team thinks that an "Unproven" is a more appropriate response.]

29. LIA's 15 elements of ILS assessment. Assessed.

[This study team was able to determine that OPTEC did conduct an ILS review for the FBCB2 basic system. They reported "No issues. Program under control."]

30. Fielding schedule.



- a. In time for the First Digitized Div (Sep 2000). Yes.
- b. In time for the First Digitized Corps (2006). Yes.
- c. During FY 07-10. Unknown.

31. Overall Peacetime (Programmatic) risk. Amber

[It should be noted that the SME assigned an "Amber" peacetime/programmatic risk rating. The SME responded, "The FBCB2 is a wartime only system and can only be used during garrison for training. Therefore, it is imperative that this system be used as much as the weapons system in deployment to minimize any wartime risk. Since this system has not been tested and only a fraction of the CSS applications has been tested, I give this system an amber rating."]

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. High.

Not yet tested, but anytime you become largely dependent on radio communications, the threat will always find a way to disrupt your communications, and wreck havoc on your plans.

33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation. Unknown.

Not yet tested (the Variable Message Formats (VMF) for the prerequisite CSS functional message inputs). If the VMF are properly tested, the likelihood of degradation is very minor.

[SME did not address the likelihood of wartime degradation to the "assured communications" part of the WIN that are required by the FBCB2-CSS Functionality initiative. This study team does not know the battlefield risk to the availability of assured communications.]

34. Wartime backup (BU) system. Manual modes would be used, such as: radio, fax and courier. This in itself would decrease the CSS situational awareness for commanders at all levels and greatly increase the response time.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. N/A.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. High. Severely limited. Manual modes would be used, such as: radio, fax and courier. This in itself would decrease the CSS situational awareness for commanders at all level.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Medium.

The workload would increase for the division and Corps support requirements due to an operational requirement to maintain two systems. Task Organizations (TO) would be almost impossible to manage and the credibility of the systems would be degraded to a point until only one system would be used.

38. Other adverse wartime impacts (e.g., scenario dependent). None.

39. Overall wartime risk associated with employment of this CSS E/I. Amber.

The wartime threats identified for FBCB2 are mostly tied to the signal (Tactical Internet) requirements, and the inherent signature that radio frequency equipment generates. Technology is under development to counter the Electronic Warfare (EW) threat.

40. Overall risk (considering both programmatic and wartime risks). Amber

[This study team assigned an overall rating of "Amber" based on the programmatic risks as discussed above in paragraph 31 and the wartime employment risks identified in paragraph 39 above.]

41. Ordinal ranking of this CSS E/I by the CSS DCDs.

42. Cardinal ranking of this CSS E/I by the CSS DCDs.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities.

44. Remarks. None

45. Data Sources. MAJ Fox/ MAJ Peterson, Office of the TSM for CSSCS, CASCOM, DSN: 687-1434; CASCOM. FBCB2 Operational Requirements Document and User Functional Description.

1. Title. Fork Lift Pallet Trailer (FLPT).

2. Designation. FXXI CSS Initiative.

a. Description: The Fork Lift Pallet Trailer (FLPT) is a lightweight, portable combination trailer and fork lift. The HMMWV will tow the FLPT.

b. Characteristics:

- \* Light weight (840 lbs.)
- \* Size 79"W x 37"L x 37"H (overall with drawbar retracted)
- \* Total 3100 lbs. capacity
- \* Tilting bed (manual/hydraulic or electric/hydraulic)
- \* All terrain capability
- \* Fits on the cargo bed of the HMMWV troop carrier (M1097A2) for transport

c. Requirement/Need/Mission: Our power projection Army requires rapid movement of ammunition in to rearm combat units and fighting vehicles in the shortest time possible. The FLPT can fulfill this mission at an ammunition air drop site or Ammunition Transfer Point (ATP). Ammunition at air drop sites is now broken down from pallets into individual containers and then manually carried to various CSS vehicles for transport to the fighting vehicle. The FLPT negates the need to break down the pallet and carry ammunition to a transport vehicle. It transports pallets up to 3100 lbs. directly to the fighting vehicle and saves valuable time and effort.

3. DTLOMS Area.

a. Primary: Materiel.

b. Secondary: None.

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Modernization.

5. CSS BOS Function.

a. Primary: Arm.

b. Secondary: Fuel, Fix, Man, Distribute, Sustainment Engineering.

6. FXXI Priority. High.

High within the CASCOM (DCD-Ord Dir) and US Navy.

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. None.

[Was not contained in this Plan.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed.

9. The 1996 US Army Modernization Plan. Not Reviewed.

10. Prerequisite(s).

a. FXXI E/Is. None.

b. Other prerequisites. None.

11. Overall risk status of

a. Prerequisite E/Is. N/A.

b. Other prerequisites. N/A.

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. N/A.

b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? None.

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I?  
None

16. Supporting analytical studies. None.  
No AOA is required.

17. Changes in manpower requirements caused by fielding this given CSS E/I. None.

18. Related changes in CSS efficiency. Increase.  
Added MHE capabilities. Will save time and effort when offloading CROPS. Actual amount of efficiencies to be gained is yet-to-be-determined.

19. Related changes in CSS effectiveness. Increase.  
The FLPT negates the need to break down the pallet and carry ammunition to a transport vehicle. It transports pallets up to 3100 lbs. directly to the fighting vehicle.

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself). None.

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Not Developed.

Too early in the FLPT development cycle. Awaiting Foreign Development Technology monies to become available in Sep 97. Then we plan to procure a few FLPTs from the Canadian Army for US CEP testing.

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. N/A

None required.

b. ORD. No.

Too early yet. An ORD may not even be required.

c. BOIP. No.

BOIP is To-Be-Determined.

23. CSS E/I training in TRADOC schools. No.

Too early yet.

24. Examined in

a. TF XXI AWE (Mar 97). No.

b. TRAC's Div Design Analysis Study. No.

c. The Nov 97 DAWE. No.

25. Tested elsewhere. Yes.

[SME stated that this item is fielded in the Canadian Army. However, he had no results of field tests or quantitative efficiencies/effectiveness.]

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. No.

PROGRAM FUNDING: FY 96 (RDTE): \$27K, FY 97 (RDTE): \$40K. The FLPT is in service with the Canadian Army. Funding covers test and evaluation to ensure the system meets US Army requirements. We have bought two systems with 6.3 monies. All other monies have been pulled back. FLPT is currently unfunded.

27. Planned BOIP (connectivity between FPs). Unknown.

28. Technical capabilities. Proven.

Proven in Canadian Army field trials. However, no hard test results are available.

29. LIA's 15 elements of ILS assessment. Not Assessed.

Too early yet.

30. Fielding schedule.

- a. In time for the First Digitized Div (Sep 2000). Unknown.
- b. In time for the First Digitized Corps (2006). Unknown.
- c. During FY 07-10. Unknown.

31. Overall Peacetime (Programmatic) risk. Red.

Lack of funding, lack of US Army testing, uncertainty if ORD is required.

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.

33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation. N/A.

34. Wartime backup (BU) system. Only BU system would be manual labor and/or available MHE to break out supplies directly from pallets.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. N/A.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. Medium. Use of manual labor and/or available MHE would be labor and time intensive. This would directly affect the maneuver commander's options. Due to MHE enhancements within the US Army logistical units, the combat units must also evolve from manual labor to be able to take advantage of the efficiencies gained from portable MHE (right now the combat units have none). So, if for example the combat units were to lose the FLPT for some reason, the wartime risk would become "Amber" due to the increased resupply/load times of the weapon systems-box by box.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Medium. Increased reliance on conventional MHE and manual labor for those units not receiving the FLPT.

38. Other adverse wartime impacts (e.g., scenario dependent). None.

39. Overall wartime risk associated with employment of this CSS E/I. Green.

40. Overall risk (considering both programmatic and wartime risks). Red.  
Lack of funding, lack of US Army testing, uncertainty if ORD is required.

41. Ordinal ranking of this CSS E/I by the CSS DCDs.

42. Cardinal ranking of this CSS E/I by the CSS DCDs.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities. N/A.

[The FLPT was not discussed in this Plan.]

44. Remarks. None.

45. Data Sources. MAJ VonDorn, CASCOM (DCD-Ord Dir), DSN: 687- 0251.

1. Title. Forward Repair System-Heavy (FRS-H)

2. Designation. FXXI CSS Enabler-ORC

The FRS-H offsets the heretofore unresourced requirement to (a) "repair forward" (in the form of overhead lift), (b) reduce recovery time (RCT) under the VM concept by providing the correct resources to the mechanic, on site, when he needs them, and (c) digitize maintenance forward by providing a digitization platform.

a. Description: The Forward Repair System - Heavy is a self contained, multicapable heavy repair system consisting of an ensemble of hand and power tools, TMDE, welding and cutting equipment, and air compressor in an enclosure; 50 kW generator set; and 5.5 ton crane carried on a PLS vehicle chassis.

b. Characteristics: FRS-H will utilize the basic PLS chassis and mount maintenance components on a flat rack. Specific maintenance features are as follows:

- Secure enclosure with easy access to tools and equipment.
- Industrial quality tools and equipment to optimize support of heavy systems.
- Full ARC and gas welding and cutting capability.
- Air compressor for tools and utility support.
- CTS III test and diagnostic equipment with electronic manual data bases.
- Lift capability needed to replace/repair heavy components, i.e. Full Up Power Pack (FUPPs)
- High mobility standard chassis.
- Payload to include spares, special tools, bench stock, support system references, military gear.

c. Requirement/Mission/Need: The FRS-H provides high tech on-site support for Force XXI heavy combat systems and minimizes the need for additional maintenance equipment to accomplish missions. The FRS-H will replace the current M113 maintenance vehicle with its entourage of cargo and lift vehicles. The FRS-H has sufficient mobility to deploy with the combat trains and maintain continuous support of the maneuvering forces. The design of the enclosure and components will be developed for maximum efficiency, capability, safety, and accessibility. The FRS-H is being assembled as a flat rack mounted variant of the PLS vehicle and will be evaluated beginning in 1996. As a PLS variant it could contribute to other critical battlefield missions as commanders deem necessary, however the maintenance components would have restricted capability when separated from the chassis. Also in development is the PLS independent suspension system which enhances mobility and speed on rough terrain.

d. Milestones: The program is progressing toward a MS II Review in 1998. A contract was awarded during 4th quarter FY 95 to begin design and development of a flat rack configured FRS-H. The system was completed in FY 97 and is currently going through field experimentation. Preliminary data demonstrates that the concept as configured has proven itself.



3. DTLOMS Area.

a. Primary: Materiel.

b. Secondary: None.

4. CSS E/I Type (Digitization/Modernization (D,M,Both)). Both

The FRS-H will replace the M113 maintenance vehicle. The FRS-H will incorporate the latest digital diagnostic test equipment available. This coupled with the Positive Navigation (POSNAV) system will enable the FRS-H crew to requisition parts from remote locations.

5. CSS BOS Function.

a. Primary: Fix.

b. Secondary: None.

6. FXXI Priority. Unknown.

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. High.

[The FRS-H was prioritized as #6 out of 51 items. Also, it was prioritized # 3 out of 21 Ordnance items.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed

9. The 1996 US Army Modernization Plan. Reviewed.

[The Maintenance Equipment Program, page 1-15 of this Plan, discusses the "forward repair system." It indicates that "... The forward repair system replaces current tracked maintenance vehicles. The current family of repair vehicles provides only limited onboard storage for repair modules and diagnostic tools. The wheeled repair vehicle improves mobility and support provided by unit mechanics and direct support repairers in armor and mechanized battalions and their direct support maintenance support units." The Maintenance Equipment Program was rated "Red" for the near-term (FY 96-98), "Amber" for the mid-term (FY 99-01) and "Red" for the far-term (FY 02-11) due to reduced procurements.]

10. Prerequisite(s).

a. FXXI E/Is. None.

b. Other prerequisites. None.

11. Overall risk status of

- a. Prerequisite E/Is. N/A.
- b. Other prerequisites. N/A.

12. Adverse programmatic (peacetime) risks on

- a. The "prerequisite" E/Is if this given CSS E/I is not fielded. N/A.
- b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? None.

[SME responded that "The FRS-H system is needed to support the FXXI maintenance concept and mitigate the adverse effects of the loss of maintainers through the FXXI Division Redesign." While although the "FXXI maintenance concept" by itself is not designated as a FXXI CSS enabler/initiative, the overall synergistic benefit expected from this concept relies on successfully fielding many different FXXI maintenance enablers/initiatives.]

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

[SME responded that "Loss of maintainers through the FXXI Division Redesign will overwhelm the current fix forward maintenance platforms and their operators. Our current maintenance force structure is designed to support the pre AOE. The FRS-H when combined with other planned FXXI maintenance enablers/initiatives will enable us to leap ahead to a position where we can support AOE and FXXI. The real time information flow which results from current information dominance initiatives will elevate the expectations of commanders for Combat, CS and CSS assets to respond in near real time. If the M113 remains the center of gravity for heavy forward maintenance operations in a digitized Army, our future combat systems will be forced to rely on an outdated maintenance platform." However, the "FXXI maintenance concept" is not designated a FXXI CSS enabler/initiative. Therefore, this study team assigned a "N/A."]

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? Specify.  
Fielding the FRS-H will greatly benefit any system requiring heavy forward maintenance repair.

16. Supporting analytical studies. None

[SME did not know of any COEAs/AOAs. However, he indicated that FRS-H CEP tests were completed in 1989 and 1993. The results of these CEPs validated the need for the FRS-H requirement. Further, results of these CEP tests are available at CASCOM.]

17. Changes in manpower requirements caused by fielding this given CSS E/I. Unknown.

[a. SME responded "Unknown at this time if there will be any decrease in manpower requirements. With only one prototype, there is not way to determine this yet. However, no increase in manpower requirements is expected."

b. SME also advised that (a) the crew sizes were to be the same going from the M113 to the FRS-H, (b) Engineer units currently do not have M113 maintenance vehicles, but are due to receive Abraham's-based systems in the future. They will need the FRS-H in this event. Therefore, fielding the FRS-H into Engineer units will be as an additional vehicle, not replacing anything (and could possibly mean added crew members). This could also cause a collateral (second order) increase in maintenance requirements. However, for equipment there is the possibility that there may be a diminished need for tool vans, as the FRS-H has an enhanced tool configuration. Also, the FRS-H can haul a FUPP trailer. This may diminish the need for 5 ton cargo trucks to transport FUPPs to repair sites, allowing the 5 ton cargo trucks to do other missions.

c. This study team thinks that there could be the possibility of an overall "increase" in manpower requirements due to fielding the FRS-H (refer to the Engineer unit issue above). Thus, this study team elected to assign an "Unknown."]

18. Related changes in CSS efficiency. Increase.

Reduced manhours for repair missions. The FRS-H is a self-contained unit lift; quality hand and power tools; welding equipment; on board power source; TMDE; and bench stock all on one platform.

19. Related changes in CSS effectiveness. Increase.

Reduced turn around time for repair missions. Relieves the M113 and M88 from performing repair missions. Frees up the M88 to do its intended mission. The expected increases in both efficiencies and effectiveness have been proven by various prototype (Armored Maintenance Vehicle (AMV) and the Heavy Recovery Vehicle (HRV) CEP tests conducted in 1989 (AMV) and 1993 (HRV).

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself). None.

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Unknown

None may have yet been developed since we are in Pre Milestone I.

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. Yes.

[SME advised that all supporting documentation was approved in the late 1980s and has remained unchanged until final system configuration is determined.]

b. ORD. Yes.

[SME advised that all supporting documentation was approved in the late 1980s and has remained unchanged until final system configuration is determined.]

c. BOIP. No.

There was a BOIP for an earlier version of the FRS-H, but it likely is now outdated. The FRS-H will be fielded on a one-for-one swap with the current M113 maintenance vehicle. Note: Engineer units currently do not have M113 maintenance vehicles, but are due to receive Abraham's-based systems in the future. BOIP/TOTAL REQUIREMENT: The LIN for the FRS-H is Z06157 (this is a placeholder LIN carried over from the AMV; and the BOIP is O023AA, the BOIP code is also carried over from the AMV. ACALA is currently establishing stand alone LIN and BOIP code for FRS-H. The FRS-H would replace the M113 used as a maintenance vehicle. The estimated TOE requirement is estimated at 1,600 systems. Force Package I is 258; Force Package II is 339; Force Package III is 426; and Force Package IV is 577. FRS-H will become the heavy maintenance vehicle in organic heavy combat units and in maintenance teams. It will also replace the need for lift support by a M88 recovery vehicle and repair parts delivery by a cargo truck.

23. CSS E/I training in TRADOC schools. No.  
Not yet, as the FRS-H is still in Pre Milestone I.

24. Examined in

a. TF XXI AWE (Mar 97). No.

b. TRAC's Div Design Analysis Study. No.

c. The Nov 97 DAWE. No.

25. Tested elsewhere. Yes.

The expected increases in both efficiencies and effectiveness have been proven by various prototype AMV and the HRV CEP tests conducted in 1989 (AMV) and 1993 (HRV). Also, FRS-H safety release testing was performed at Aberdeen Proving grounds, MD in Dec 96. The FRS-H passed.

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. No.

PROGRAM FUNDING: MDEP FPJA 01; Standard Study Number (SSN) DA0073. Estimated Unit Cost is \$500K for the whole system, including the PLS. FRS-H is currently not funded. In FY 95 the PM PLS spent \$500K RDT&E funds to design/develop a FRS-H flat rack variant. We are attempting to secure WRAP funds from FY98 funds to develop a battalion set of FRS-H. In addition we will build two for testing to secure type classification.

[CASCOM FRS-H CEFA Funding Matrix indicates that 1600 FRS-H are desired (FP 1: 258; FP 2: 339; FP 3: 426; FP 4: 577) for a total procurement funding requirement of \$800M, all of which is unfunded.]

27. Planned BOIP (connectivity between FPs). Yes.

Plans call for fielding the FRS-H to all four FPs. However, fielding is uncertain due to recent force structure changes and funding uncertainties.

28. Technical capabilities. Proven.

The PLS chassis of the FRS-H system is a fielded and proven vehicle. Also, CEP evaluations conducted in 1998 and 1993 proved the maintenance capabilities of the earlier versions (AMV and HRV) of the FRS-H. These tests demonstrated that the AMV and the HRV decreased turn around time on repairs and the dependency on M88s for repair missions. Additionally the mounting of FRS-H components on a flatrack expands the capabilities of the system.

29. LIA's 15 elements of ILS assessment. Unknown.

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). No.

b. In time for the First Digitized Corps (2006). No.

c. During FY 07-10. Unknown.

31. Overall Peacetime (Programmatic) risk. Red.

No funding.

[For selected other CEFA enablers/initiatives, when they were assessed as having (a) approved MNS & ORDs, (b) been tested, and (c) proven technical capabilities, their respective SME usually assigned an "Amber" (and not "Red") peacetime risk if there were no programmed funds. However, this study team thinks that in assigning a "Red" rating the FRS-H SME may have considered the fact that this specific program has been around for many years under different names, and now is back at pre Milestone I. Furthermore, "Red" also seems appropriate to this study team until the issue of a possible increase in manpower requirements (crews) associated with fielding the FRS-H to engineer units is resolved.]

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.

The PLS chassis has proven RAM. The threat to the FRS-H is similar to supported forces.

33. Likelihood of prerequisite C,CS or CSS E/I wartime degradation. N/A.

34. Wartime backup (BU) system. Only expected BU systems would likely be the borrowing of another FRS-H from a sister unit, or the use of available M88s (business as usual) to do forward maintenance repair rather than their intended recovery mission.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. N/A.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available.  
Medium.

Forward maintenance repair in support of the maneuver commander would be degraded, thereby reducing system Operational Availability rates. If the M88 is used for forward heavy maintenance, then there would be a degradation in the recovery of prime weapon systems. These actions have a direct effect on successfully conducting the warfight.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Medium.

Potential loss of synchronized maintenance efforts if units having the FRS-H and not having it are deployed together in the same conflict. However, plans call for fielding the FRS-H to all four FPs.

[Such would adversely affect battlefield attainment of the synergistic benefits planned from employing the new FXXI maintenance concept in all four FPs.]

38. Other adverse wartime impacts (e.g., scenario dependent). None.

39. Overall wartime risk associated with employment of this CSS E/I. Green.

40. Overall risk (considering both programmatic and wartime risks). Red

No Funding. Not fielding the FRS-H may impose severe consequences on the proposed FXXI maintenance concept..

[For selected other CEFA enablers/initiatives, when they were assessed as having (a) approved MNS & ORDs, (b) been tested, and (c) proven technical capabilities, their respective SME usually assigned an "Amber" (and not "Red") peacetime risk if there were no programmed funds. However, this study team thinks that in assigning a "Red" rating the FRS-H SME may have considered the fact that this specific program has been around for many years under different names, and now is back at pre Milestone I. Furthermore, "Red" also seems appropriate to this study team until the issue of a possible increase in manpower requirements (crews) associated with fielding the FRS-H to engineer units is resolved.]

41. Ordinal ranking of this CSS E/I by the CSS DCDs.

42. Cardinal ranking of this CSS E/I by the CSS DCDs.

43. Comparison of rankings to CASCOR CDR's 4 Sep 96 CSS MMP priorities.

44. Remarks. None

45. Data Sources. CPT K.C. Simpkins, CASCOM (DCD-Ord Dir), DSN: 687-0497). CASCOM Sep 97 CSSMMP and related May 97 updates.

1. Title. Heavy Equipment Recovery Combat Utility Lift and Evacuation System (HERCULES).

2. Designation. FXXI CSS Enabler-ORC.

[SME designated the HERCULES as an Enabler since it offsets the required capability to recover one Main Battle Tank with one recovery vehicle-currently it takes two recovery vehicles.]

a. Description. HERCULES, formerly M88 Improved Recovery Vehicle (IRV), replaces the M88A1 to safely recover M1 series tanks and future heavy combat vehicles such as Breacher and Heavy Assault Bridge.

b. Characteristics. System performance improvements include: 40% increase in engine horsepower (from 750 to 1050), improved transmission and final drives, power assist brakes, heavier suspension, improved hydraulics and electrical system, 30mm armor protection, 25% increase in weight (from 56 to 70 tons), 55% increase in main winch capability (from 45 to 70 tons), 40% increase in lifting capacity (from 25 to 35 tons) and addition of a 6000 pound auxiliary winch to help deploy the main winch cable.

c. Requirement/Need/Mission. HERCULES provides combat and support units the capability to safely recover heavy combat vehicles, to include lifting, towing, and winching, with one recovery vehicle. HERCULES operates in the same environment and geographical areas as the supported systems. HERCULES provides safe operation, braking, steering control and adequate mobility to perform recovery and maintenance operations such as towing, turret removal, powerpack replacement, recovery of nosed-in, overturned or mired armored vehicles. Secondary recovery functions include a cutting capability for removal/repair of damaged components, an auxiliary power unit for tools, a refuel/defuel pump, and tools to perform recovery and repair tasks.

d. Milestones.

IOTE-AUG-SEP 96

MSIII/Type Classification-2nd Qtr 97

FUE-3rd Qtr 97 (First Cavalry Division)

3. DTLOMS Area.

a. Primary: Materiel.

b. Secondary: None.

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Modernization. HERCULES replaces medium recovery vehicles in units with heavy armored vehicles. Future pre-planned product improvements will provide improved digital diagnostics of



hydraulic and electrical systems on the HERCULES.

5. CSS BOS Function.

a. Primary: Fix.

b. Secondary: None.

6. FXXI Priority. High.

Currently funded for \$360M Other Procurement Army (OPA) in the FY 98-03 POM. Initial fielding is to the 1<sup>st</sup> Cav division, FT Hood.

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. High.

[The HERCULES was prioritized #5 out of 51 systems. Also, it was prioritized #2 out of 21 Ordnance items.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed.

9. The 1996 US Army Modernization Plan. Reviewed.

[The Core Support Program (Maintenance Equipment) of this Plan, page I-15, reviewed the HERCULES. It indicates that "...Hercules, formerly known as the improved recovery vehicle, provides recovery support to Abrams tanks and systems mounted on the Abrams chassis...HERCULES is a product improved M88A1.... The Maintenance Equipment program is rated "Red" for the near-term (FY 96-98), "Amber" for the mid-term (FY 99-01) and "Red" for the far term (FY 02-11) due to reduced procurements. The Contingency Force receives only 33% of the contact maintenance trucks, and 10% of the HERCULES...."]

10. Prerequisite(s).

a. FXXI E/Is. None.

b. Other prerequisites. None.

11. Overall risk status of

a. Prerequisite E/Is. None.

b. Other prerequisites. N/A.

12. Adverse programmatic (peacetime) risks on

- a. The "prerequisite" E/Is if this given CSS E/I is not fielded. N/A.
- b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? Specify.

Any heavy vehicle requiring the specific recovery/towing capabilities of the HERCULES.

[Some of these vehicles may be classified as Combat or CS FXXI enablers/initiatives.]

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. Medium. Without HERCULES support we can expect up to a 50% reduction in tanks and other heavy combat vehicles returned to the battle due to the requirement for two M88A1s per recovery and/or requirement to use like vehicle for recovery.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? Specify. Many other heavy vehicles requiring recovery/towing will benefit from increased capabilities of the HERCULES.

16. Supporting analytical studies. None.

HERCULES is an ACAT III Program. On 6 Apr 94 the US Army Ordnance Center and School (USAOC&S) requested that a compilation of historical Senior level guidance replace the requirement for a formal COEA. It is not known if this request was approved.

[Also, no COEA/AOA may have been performed due to the May 93 CDR TRADOC message which indicated that formal COEAs are no longer required for ACAT III and IV systems.]

17. Changes in manpower requirements caused by fielding this given CSS E/I. None. Currently TOEs only resource the M88A1 with a tank commander and driver. This will not change with the HERCULES. However, to conduct a recovery mission now requires two M88A1s, each requiring two additional mechanics for each recovery mission. HERCULES will only require the resourcing of one additional mechanic per recovery mission and one vehicle.

[This extra person is an available mechanic who is released back to his primary job after the recovery mission is completed.]

18. Related changes in CSS efficiency. Increase.

The HERCULES requires one additional person (mechanic in addition to the crew of two) for recovery, whereas the current M88A1 requires two additional (part time) mechanics per recovery mission. The HERCULES will have faster speed and a more

powerful winch. And lift which will result in less time for rigging.

19. Related changes in CSS effectiveness. Increase.

HERCULES only requires one recovery vehicle per tank rather than the two required now.

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself). None.

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Developed.

Existing approved recovery concept applies to the HERCULES. HERCULES will enable materiel to catch up to doctrine.

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. Yes.

Approved in 1985.

b. ORD. Yes.

Approved in 1996.

c. BOIP. Yes.

Approved (one for one replacement of the M88A1). BASIS OF ISSUE/TOTAL REQUIREMENT: HERCULES replaces the M88A1 in Armor BNs (7ea), Regimental Cavalry Squadron (7ea), Division Cavalry Squadron (5ea), Engineer BNs with HAB/Breacher (2ea), and Forward Support BN (FSB)/Main Support BN (MSB) (1ea). The Army Acquisition Objective (AAO) is 632. This will fill requirements for FP I and part of FP II. FP I requirement is 155, Total FP requirement is 961. LIN: Z62381. BOIP: O041AA. (Replaces M88A1LIN: R50681). Fielding starts in 4<sup>th</sup> quarter FY 97.

23. CSS E/I training in TRADOC schools. Yes.

Training is resourced and POIs are being developed to support HERCULES fielding in 4<sup>th</sup> quarter FY 97.

24. Examined in

a. TF XXI AWE (Mar 97). No.

Production units were not available.

b. TRAC's Div Design Analysis Study. No.

c. The Nov 97 DAWE. No.

25. Tested elsewhere. Yes.

Just completed DT II at Aberdeen Proving Grounds, MD. And OT II at Ft Carson. Follow on testing is scheduled in FY 97, 98 and 99 for traction issue. The vehicle had problems on ascending 15%-25% slopes when soil was wet.

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. Yes. Pre FY 98: \$167.9M for 64 FP 1 systems. FY 98-03: \$323M for 105 FP I systems and 49 FP 2 systems. EPP: \$840M for 100 FP 2 systems, 28 FP 3 systems, and 275 FP 4 systems. This totals 961 systems for \$1330.9M. Quantities are based on an estimate of \$2.1M per vehicle. There also is an unfunded FP 4 requirement for 340 systems for \$816M.

PROGRAM FUNDING: MDEP RA08 SSN GA0570.

27. Planned BOIP (connectivity between FPs). Yes.

[SME indicated that he was uncertain of fielding by Force Packages. However, he provided the following fielding schedule: 1<sup>st</sup> CD-52 systems equipped by FY 00; training base-8 systems by FY 01; 3<sup>rd</sup> ACR-27 systems by FY 01; the NTC-10 systems by FY 01; FT Leonard Wood-2 systems by FY 01; 3<sup>rd</sup> ID-45 systems by FY 03; III Corps-18 systems by FY 04; Prepo-34 systems by FY 05; training base-8 systems by FY 05; 2<sup>nd</sup> ID-43 systems by FY 06; 4<sup>th</sup> ID-52 systems by FY 07; I Corps-4 systems by FY 08; Prepo-61 systems by FY 09; 1<sup>st</sup> ID-52 systems by FY 10; 1<sup>st</sup> AD-52 systems by FY 11; Prepo-48 systems by FY 11; 11<sup>th</sup> ACR-9 systems by FY 12; and NG units-76 systems by FY 12-15.]

28. Technical capabilities. Proven.

Proven during various technical and operational tests over the last five years. The current issue is over how good traction is while towing a 70 ton load up 15-25% slopes under wet conditions. Tests results available in CASCOM (DCD-Ord Dir).

29. LIA's 15 elements of ILS assessment. Assessed.

Green, Operational Evaluation Command (OEC) evaluation report, 20 Mar 97.

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). No.  
Only 76 vehicles will be produced by FY 00.

[Above fielding plan calls for the 4<sup>th</sup> ID to receive HERCULES in FY 07.

b. In time for the First Digitized Corps (2006). Unknown.  
278 vehicles produced, but fielding sequence must change.

[SME responded "Yes" but then indicated that the current fielding schedule must change." The 4<sup>th</sup> ID does not get the HERCULES until FY 07. Therefore, this study team assigned an "Unknown" until this is resolved.]

c. During FY 07-10. Yes.

Refer to paragraph 27 above.

31. Overall Peacetime (Programmatic) risk. Green.

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.

Threat to the HERCULES will be the same as currently experienced by the M88A1 and supported units.

33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation. N/A.

34. Wartime backup (BU) system. Only available BU system would be recovery by like vehicles or the use of another support unit's HERCULES, if available.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. N/A.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. Medium.

Use of these BU systems would remove an operational vehicle from combat for towing, or could degrade the recovery potential of other support units who loaned out their HERCULES.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Medium. Units that did not receive HERCULES would require two M88A1s or a like vehicle to recover M1 vehicles. The M88A1s do not have the speed to keep up with high OPTEMPO.

38. Other adverse wartime impacts (e.g., scenario dependent). Low.

The HERCULES does not have air conditioning for long term use in extreme hot weather.

[Based on the SME response, this study team assigned a "Low" response.]

39. Overall wartime risk associated with employment of this CSS E/I. Green.

40. Overall risk (considering both programmatic and wartime risks). Green.

41. Ordinal ranking of this CSS E/I by the CSS DCDs.

42. Cardinal ranking of this CSS E/I by the CSS DCDs.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities.

44. Remarks. None.

45. Data Sources. MAJ Fitch, CASCOM (DCD-Ord Dir), DSN: 687-1780. CASCOM Sep 96 CSSMMP and related May 97 updates.

1. Title. Improved Environmental Control Units (IECU).

2. Designation. FXXI CSS Initiative.

[a. SME indicated that the IECU was (a) a FORCE XXI CSS initiative, and when completely fielded, will result in force structure equipment efficiencies, (b) an AOE CSS initiative. "Yes, in part. Selected internal components (connectors, compressors, valves, lines, etc.) have been previously replaced with upgraded components to be compatible with the new refrigerants." and (c) an Army After Next (AAN) initiative. "Yes, in part. By that time, a completely non-ozone depleting refrigerant will hopefully be available for use. Much of the same common hardware will hopefully be able to be used."

b. The Chief of Ordnance designated the IECU as a "FXXI" initiative.]

#### DESCRIPTION/CHARACTERISTICS

- o IECUs are primarily Air Conditioners of various BTU sizes which use non-ozone depleting, environmentally acceptable refrigerants.
- o IECUs are an ongoing effort combining the functions of heating, air conditioning, dehumidification, and humidification into one unit.
- o IECUs comply with Environmental Protection Agency (EPA) mandates and Clean Air Act of 1990 by replacing R-12 with R-22 (initially) then R-134a (and possibly 407c).
- o Specifications vary by British Thermal Unit (BTU) size (6K, 9K, 18K, 36K and 60K) and configuration (vertical or horizontal), but generally are identical in form, fit and function with existing Mil-Std air conditioners.
- o IECUs will have the added feature of multiple power input (MPI) allowing the use of both 60 Hz or 400 Hz power sources.
- o Participating in TF XXI in M1097, M1068, C2V, M934 and TOC.

3. DTLOMS Area.

a. Primary: Materiel.

Materiel: The acquisition and subsequent materiel development of this hardware capability and their associated components are designed to satisfy capability deficiencies IAW the Clean Air Act of 1990, the Montreal Protocol, and subsequent international environmental agreements.

b. Secondary: Doctrine, Training, Organization.

Doctrine: Affects procedural changes to the methods by which the military prevents ozone depleting refrigerants from being vented into the atmosphere.

Training: New methods of training and certifying soldiers to be licensed to repair equipment containing ozone depleting refrigerants are detailed in the Clean Air Act of 1990 and subsequent international agreements.

Organization: An additional skill identifier and certification cards are required to

designate those soldiers qualified to work on equipment having ozone depleting refrigerants. In addition to the personnel issues, new Recovery and Recycling machines are required to be added to applicable authorization documents.

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Both.

Some modernized models provide the requisite cooling and climate control to operate digitized equipment in enclosed areas. Eventually, they may also introduce computerized, automated, digital operator panel displays as well as modernized, sophisticated integration of commercial components. Future product improvements may include a data buss that diagnoses and prognoses potential operational mission failures, as well as being annotated in ETM/IETM formats.

5. CSS BOS Function.

a. Primary: Man.

The distribute/sustain portion of the Man function.

b. Secondary: Fix.

FIX (provides climate controlled atmosphere for maintenance shop sets, Contact Maintenance Truck, Forward Repair System, etc.), ARM (primary use is with storage facilities and transportation from one location to another), FUEL (single fuel directive, Battlefield Distribution, Total Asset Visibility, etc.), and MOVE (facilitates mobilizations and deployments in areas of environmental extremes.

6. FXXI Priority. Low.

Based on its requested participation in the AWE by Divisional personnel. Subsequent briefings at Ft Hood substantiate and support this affirmation.

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. Medium.

[IECU was prioritized #21 out of 51 items, and was # 8 out of 21 Ordnance items.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed.

9. The 1996 US Army Modernization Plan. Reviewed.

[Page I--8 through I-10 describe the Sustain The Force program. A part of this is the IECU (page I-10). the Plan indicates that "...The family of IECUs, currently in research and development, will offer better reliability, maintainability, and efficiency than currently fielded environmental control units, and will also use a non-ozone depleting refrigerant. These environmental control units are designed for the broad range of command and control intelligence electronic warfare tactical shelter applications, and are required for successful operation of sensitive mission critical equipment in adverse environments. FY 98 production is currently planned.... This program (Sustain The Force) is rated Amber for near-mid-far terms (FY 96-11).]



10. Prerequisite(s).

- a. FXXI E/Is. None.
- b. Other prerequisites. None.

11. Overall risk status of

- a. Prerequisite E/Is. N/A.
- b. Other prerequisites. N/A.

12. Adverse programmatic (peacetime) risks on

- a. The "prerequisite" E/Is if this given CSS E/I is not fielded. N/A.
- b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? Specify.

Many shelters, computers, automation, communication (MSE, etc.), command and control, weapon systems, missile systems, target acquisition systems, guidance systems, launch platforms, causeways, refrigeration, food service, hospital/medical treatment facilities, laundry units, Force Provider, well kit, printing plant, topographic support systems, water purification units, bakery plants, automatic data processing (ADP) systems, calibration facilities, maintenance shop sets, aviation facilities, air traffic control units, schools, earth-satellite facilities, and any other system(s) requiring climate controlled air to operate.

[Note: no other CASCOM SME responding for his/her respective FXXI CSS enabler/initiative indicated that they "required" the IECU for the fielding of their system. However, this study team agrees with the SME that many new FXXI systems (perhaps some designated as enablers/initiatives) may in fact "require" the IECU.]

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. Medium.  
Renders climate controlled weapons systems to a reduced operations status in a tactical/field environment.

[This study team assigned a "Medium" answer based on the SME's response.]

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? Specify.

Any other enabler/initiative requiring climate controlled environments to operate and/or maintain. Unable to reply specifically until the combat arms and combat support communities publish their respective Force XXI enablers/initiatives lists.

16. Supporting analytical studies. None.

The SME did not know of the existence of any supporting analytical studies.

17. Changes in manpower requirements caused by fielding this given CSS E/I. None.

18. Related changes in CSS efficiency. Increase.

The MPI feature should translate into associated power provider and mobile generator efficiencies. Reduced fuel consumption, single fuel forward concept, interoperability with other 24V systems (allows slave starting in temperature extremes), no degradation in mobility/transportability should occur (nearly identical form, fit and function), improved RAM is envisioned, reduced Preventive Maintenance Checks and Services (PMCS) intervals, reduced scheduled maintenance intervals, and reduced acquisition costs.

19. Related changes in CSS effectiveness. Increase.

IECUs will be more reliable than current units, thereby enhancing the operational availability of those systems whose proper functioning depends, as a minimum, on environmental control.

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself).

Decrease.

The quantities (numbers) and sizes (density mix) of generators should be reduced due to the MPI feature of the IECUs.

[Based on the CDR CASCOM's definitions for a FXXI CSS enabler/initiative, the above SME response would suggest that the IECU should be labeled as an "enabler." However, this study team was advised (reference paragraph 2b above) that the Chief of Ordnance designated the IECU as an "initiative."]

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Developed.

Concept is approved and in existing FMs.

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. Yes.

All supporting documentation was approved in the late 1960s and subsequently updated or revised in the mid-1990s as a result of the Montreal Protocol and Clean Air Act legislation.

b. ORD. Yes.

c. BOIP. Yes.

BOIP/TOTAL REQUIREMENT:

- IECUs replace the old, ozone depleting, logistically unsupportable, uneconomical and hazardous military standard air conditioners. These are all over the battlefield and integrated/embedded into many shelters.
- Other claimants will come via Data Interchange Conferences (for items currently under development as climate controlled consuming customers).
- LIN: various (at least 30). NSN: various.
- About 10,000 (majority are horizontal) are authorized IAW Total Asset Visibility (TAV).
- Generally speaking, the IECU will replace existing systems on a one-for-one basis.

23. CSS E/I training in TRADOC schools. Yes.

24. Examined in

a. TF XXI AWE (Mar 97). No.

[SME responded that the IECU was not examined in and of itself. But, the IECU was examined as part of the fielded TF XXI shelters and other enclosures. SME had no test results.]

b. TRAC's Div Design Analysis Study. No.

c. The Nov 97 DAWE. No.

25. Tested elsewhere. Yes.

The only tests were those conducted at the Research and Development (R&D) test bed at Ft Belvoir.

[This study team does not know the date or results of the aforementioned tests.]

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. Yes.

But only into FP1 for a multitude of supported environmentally sensitive electronic equipment associated with combat, combat support and combat service support weapons systems as identified above and still yet to be identified through the Data Interchange process. Funding (OPA) profile for the 9,000 and 36,000 BTU air conditioners (only) follows: FY 98: \$1.5M, FY 99: \$4.8M, FY 00: \$4.7M, FY 01: \$4.7M, FY 02: \$1.4M, and FY 03: \$2.0M.

[Additional information provided by the SME indicates that about 1300 IECUs are unfunded for FP 1, and 2500 unfunded for each of the remaining three FPs.]

27. Planned BOIP (connectivity between FPs). Yes.

Plan is to modernize all Force Packages eventually. The total number of air conditioner assets currently on hand total nearly 18,000. The time frame is entirely dependent on funding received and funding retained. Many new air conditioner customers not yet identified will also claim ownership of various size and quantities of environmental control equipment for their yet-to-be-

fielded systems. This is known as the Data Interchange process. Meetings are held at least once a year to allow claimants to come forward and document their requirements with the appropriate Army Materiel Command (AMC) Major Army Command (MACOM) item managers.

28. Technical capabilities. Proven.

The systems are comprised of a compilation of 80-90% commercially available components. These capabilities have been tested in laboratory and R&D environments. The remaining 10-20% capability is the hardest and most expensive as the commercial base is militarized to perform its worldwide applicable missions.

29. LIA's 15 elements of ILS assessment. Assessed.

Initially fielded sets were Green, re-buy sets are yet to be rated.

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). Yes.  
In DAMPL sequence IAW DA DCSOPS guidance.

b. In time for the First Digitized Corps (2006). Yes.  
In DAMPL sequence IAW DA DCSOPS guidance.

c. During FY 07-10. Yes.  
In DAMPL sequence IAW DA DCSOPS guidance.

31. Overall Peacetime (Programmatic) risk. Amber.  
Due to lack of funds.

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.  
Threat: not likely. RAM failure: unlikely. Force Structure: Likely. Availability of Base Shelters, Prime Movers Trucks, other associated trailers, and MHE in the force structure impact the fielding and performance of IECUs.

[This study team assigned a "Low" based on the SME's response.]

33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation. N/A.

34. Wartime backup (BU) system. For all practical purposes no BU systems are planned other than the use of another IECU. However, this is not desired as such would then degrade the system that the borrowed IECU was supporting.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. High. Amber if environmental conditions are ideal for sensitive electronic equipment. Red if these conditions do not exist. This is the only tactical environmental control units to be available on the Force XXI battlefield. Adverse political ramifications come with the violation of the Clean Air Act and international law.

[This study team elected to assign "High" (Red).]

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. N/A.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Medium.

Most prevalent impacts are in enemy detection (thermal, noise and IR signatures are detectable), decreased survivability (since the enemy can detect your location with the current fleet), supply and maintenance are overburdened (PLL and ASL stockages must

include spare and repair parts as well as special tools for both the current and future ECUs.

[This study team assigned a "Medium" based on the SME's response.]

38. Other adverse wartime impacts (e.g., scenario dependent). Medium.

Operations in either temperature extremes or altitudes would be hampered.

[This study team assigned a "Medium" based on the SME's response.]

39. Overall wartime risk associated with employment of this CSS E/I. Amber.

The risks (adverse consequences) to personnel and modern, highly sensitive electronic equipment associated with the wartime failing of an IECU is considered "medium", given the likelihood of having no BU systems. This could be especially true in certain locations (e.g., SouthWest Asia (SWA)). Such IECU failure could place the entire weapon system at risk.

[To mitigate this risk, the Army could buy more IECU and stockpile them ( e.g., for "BU" systems). However, we do not plan to do this. Also, we could waive new environmental laws to evacuate freon directly into the atmosphere, thereby speeding up IECU repair during wartime.]

40. Overall risk (considering both programmatic and wartime risks). Amber.

Due to lack of funds and the "Medium" wartime risks associated with employing the IECU essentially without any practical BU systems.

41. Ordinal ranking of this CSS E/I by the CSS DCDs.

42. Cardinal ranking of this CSS E/I by the CSS DCDs.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities.

44. Remarks. None

45. Data Sources. Mr. Chad Myers, CASCOM (DCD-Ord), DSN: 687-2967.

1. Title. Information Management (IM) Integration.

2. Designation. FXXI CSS Initiative.

Description. IM Integration is a sub-component of the MC4 FXXI initiative. The goal of IM Integration is to provide a global linking of DOD databases and integration centers that are accessible to the warfighter, anywhere, anytime, in any mission. The mission is to provide integrated automation of the theater medical environment. It will provide for information linking of all echelons of medical care in support of time-sensitive decision critical to the success of tactical commanders through integration with the AGCCS and the CSSCS. This initiative will provide support to the Theater Medical Information Program, a joint concept that will integrate medical capabilities to assist the medical commander/surgeon and to support the delivery of seamless combat medical care. This initiative will support all echelons of care through an aggregation of medical data and situational reports that serves the tactical operations and Continental United States (CONUS) sustaining base.

3. DTLOMS Area.

a. Primary: Materiel.

b. Secondary: Soldiers.

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Both.

5. CSS BOS Function.

a. Primary: Man.

b. Secondary: None.

6. FXXI Priority. Unknown.

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. None.

[IM Integration was not listed in this plan.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed

9. The 1996 US Army Modernization Plan. Reviewed.

[IM Integration was "indirectly" reviewed. AMEDDC&S SME reported that IM Integration is a sub-component of the MC4 system. Page L-9 of Annex L, Combat Health Support indicated that: "...C4I (Command, Control Communications, Computers, and Intelligence) must provide for and manage horizontal and vertical technology insertion into all organizational designs, including MC4." This plan rated medical C4I as Red for the near-term (FY 96-98) because of the increased need for communications and split-base operations for Combat Health Support command and

control elements. The Plan related medical C4I as Red for FY 99-11 primarily due to the lack of identified funds.]

#### 10. Prerequisite(s).

##### a. FXXI E/Is. CSS.

(1) FBCB2-CSS Functionality with its medical connection from the BN Aid Station/Combat Medic. (2) CSSCS. (3) MARC card as part of the PSSCS. (4) the Warfighter Physiological Status Monitor (WPSM) medical initiative.

[SME stated that (a) the IM Integration Initiative will likely not field new supporting computers, but rather use existing ones where they can (i.e., FBCB2-CSS Functionality and the CSSCS. When queried by this study team, SME indicated that the AMEDDC&S has already coordinated this sharing of computers with proponents for FBCB2-CSS Functionality and CSSCS, and (b) loss of any one of the aforementioned prerequisites by itself would not stop the IM Integration initiative. However, each of the prerequisites by themselves contribute synergistically to the successful employment of IM Integration.]

##### b. Other prerequisites. CS.

Communications links will be needed to share information.

[This study team thinks that MSE was used in the generic sense to represent the need for some form of battlefield communications.]

#### 11. Overall risk status of

##### a. Prerequisite E/Is.

###### (1) Medium.

MARC was rated by CEFA as Amber (lack of funds).

###### (2) Low.

CSSCS was rated as Green.

###### (2) Medium.

FBCB2-CSS Functionality was rated by CEFA as having an overall "Amber" (needs testing and has a Medium wartime employment risk).

###### (3) High.

WPSM was rated as "Red" (needs funding, unproven capabilities and the unknown (to this study team) risk associated with fielding the Land Warrior).

[a. Note: the SME stated that "...the loss of any one of the aforementioned prerequisites by itself would not stop the IM Integration initiative; however, each of the prerequisites by themselves contribute synergistically to the successful employment of IM Integration." He made this statement

without knowledge of the collective risks assigned to these prerequisites. This will be further discussed in paragraph 31 below.

b. Notwithstanding what the SME wrote above, this study team felt that the synergistic impact of the individual prerequisite risks (taken collectively), with their above stated individual risks, could very well be highly detrimental to the effectiveness of IM Integration.]

b. Other prerequisites. Unknown.

[Availability/risk of adequate MSE/battlefield communications was unknown to SME.]

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. Low.  
Impact on FBCB2, CSSCS and the MARC card would be "Low" if IM Integration were not fielded. These initiatives would have to use other means for obtaining medical data.

b. The other prerequisites. None.  
MSE systems would have one less battlefield user.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? None.

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? None.

[a. MC4 needs the IM Integration in order to realize its (MC4) maximum synergistic benefits derived from the collection of patient information from many different sources. IM Integration is just one of several (e.g., WPSM, Telemedicine, Medical Logistics-Division (MEDLOG-D), TMIP) medical initiatives that input to the MC4 initiative.

b. The efficiency/effectiveness of MC4 would be degraded if IM Integration were not fielded. Manual (Combat Medic/Combat Lifesaver) and time consuming methods would have to be used to capture/integrate the data which otherwise would be provided by the IM Integration.]

16. Supporting analytical studies. None.  
No analytical studies exist.

17. Changes in manpower requirements caused by fielding this given CSS E/I. Increase.  
This initiative will require the addition of a S-6 staff (number of requirements to-be-determined) at each Combat Support Hospital, Medical Group, and Medical Command (MEDCOM).

18. Related changes in CSS efficiency. Increase.  
No empirical data to support this answer. Testing to be completed in Spring of 1998 as part of the TMIP; testing location unknown.



19. Related changes in CSS effectiveness. Increase.

No empirical data to support this answer. Testing to be completed in Spring of 1998 as part of the TMIP; testing location unknown.

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself).

Increase.

Currently there is minimal voice and data communications equipment and capability in medical units. Therefore, this initiative will have to provide for the communications infrastructure to support the linked or integrated systems.

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Developed.

Developed as part of the TMIP concept.

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. Yes.

As part of a Mar 96 Joint MNS.

b. ORD. No.

Not yet, but will be included as part of an Army-unique Aug 97 ORD for TMIP.

c. BOIP. No.

Not Yet.

23. CSS E/I training in TRADOC schools. No.

Not yet.

24. Examined in

a. TF XXI AWE (Mar 97). No.

b. TRAC's Div Design Analysis Study. No.

c. The Nov 97 DAWE. No.

25. Tested elsewhere. Yes.

(a) At the Joint Warfighter Information Demonstration 96 (they linked different sites together). (b) As part of the PRIMETIME III Bosnia operation. (3) At COBRA Gold 96 & 97 (another Joint exercise). Test results were unknown to the SME. Some of these "tests" were more like "demonstrations" in which IM Integration technology (or elements thereof) was inserted into the demonstration.

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. Yes.  
As part of the MC4 program which has \$10M allotted for FY 99 (but only for selected FP1 units).

[This study team had no information as to how much of MC4's \$10M was allocated to this IM Integration initiative.]

27. Planned BOIP (connectivity between FPs). Unknown.  
No BOIP has yet to be developed.

28. Technical capabilities. Unproven.  
The systems integration is unproven; however, some of the component systems are proven (i.e., STAMMIS).

29. LIA's 15 elements of ILS assessment. Unknown.

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). Unknown.

b. In time for the First Digitized Corps (2006). Unknown.

c. During FY 07-10. Unknown.

31. Overall Peacetime (Programmatic) risk. Red.

[a. SME assigned an "Amber" rating due to lack of funds and IM Integration's technological capabilities having been demonstrated but not yet fully proven. However, it is not clear to this study team if funding has been programmed for the extra-required equipment. As indicated in paragraph 20a above "Currently there is minimal voice and data communications equipment and capability in medical units. Therefore, this initiative will have to provide for the communications infrastructure to support the linked or integrated systems."

b. Concerning the prerequisites. The SME stated earlier in paragraph 11 that "...the loss of any one of the aforementioned prerequisites by itself would not stop the IM Integration initiative; however, each of the prerequisites by themselves contributes synergistically to the successful employment of IM Integration." The SME made this statement without knowledge of the resulting CEFA assessments for each of the prerequisites. Paragraph 11 indicates that MARC was rated by CEFA as "Amber" (lack of funds). CSSCS was rated as "Green." FBCB2-CSS Functionality was rated by CEFA as "Amber" (needs testing and has a Medium wartime employment risk). WPSM was rated as "Red" (needs funding, unproven capabilities and the unknown (to this study team) risk associated with fielding the Land Warrior.]

c. Based on the above funding uncertainties, lack of an approved ORD, unproven technical capabilities, projected increases in related manpower and equipment requirements, as well as the risks associated with the stated prerequisites, this study team subjectively assigned a "Red" response.]

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.

33. Likelihood of prerequisite C,CS or CSS E/I wartime degradation. Medium.

[CEFA assessments rated CSSCS as "Low;" MARC card as "Low;" FBCB2-CSS Functionality as "High;" and WPSM as "Low" for likelihood of wartime degradation. Also, neither the SME nor CEFA study resources were able to assess the likelihood of possible wartime degradation to MSE/battlefield communication systems- especially if they become severely overloaded due to use by many different functional systems. Based on the above, this study team subjectively assigned a "Medium" response here (due to the synergistic impact that collective failure of the set of prerequisites could have on IM Integration). It was felt inappropriate to assign a "Red" here solely due to the "High" likelihood of FBCB2-CSS Functionality's wartime degradation. Had the CEFA for FBCB2-CSS Functionality indicated something less than a "High" likelihood of wartime degradation, this study team would have assigned a "Low" response here.]

34. Wartime backup (BU) system. Manual data integration; use of sneaker nets; or one must take a written report and convert it into the requirements for another report/computer system.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. N/A.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. Medium.

C2 and Intelligence aspects of this IM Integration would slow from the automated system when going to a manual BU system. Manpower intensive efforts would be required to share or process information that would not be timely or possibly accurate.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Medium.  
Units not receiving IM Integration would adversely be impacted by not having current medical C2 and intelligence, causing the need for manual entry of information and the possible loss of situational awareness or control. These unit would not enjoy "Information Dominance."

38. Other adverse wartime impacts (e.g., scenario dependent). None.

39. Overall wartime risk associated with employment of this CSS E/I. Amber.

[Not knowing the results of the FBCB2-CSS Functionality CEFA assessment, the AMEDDC&S SME responded "Primarily from the lack of dedicated communications systems for medical applications." However, the "Amber" risk associated with the wartime employment of the FBCB2-CSS Functionality (refer to paragraph 33 above) also has to be considered.]

40. Overall risk (considering both programmatic and wartime risks). Red.

[Refer to paragraph 31 above.]

41. Ordinal ranking of this CSS E/I by the CSS DCDs.

42. Cardinal ranking of this CSS E/I by the CSS DCSs.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities. N/A.

[IMI was not discussed in this Plan.]

44. Remarks. None

45. Data Sources. MAJ Haley Windham, AMEDDC&S, DSN: 4761-2433.

1. Title. Integrated Combat Service Support System (ICS3)

2. Designation. FXXI CSS Enabler

[Refer to paragraph 17 below for an explanation as to why this study team changed the original CASCOM CEFA designation of ICS3 from an "Initiative" to an "Enabler."]

a. Description: The ICS3 will be the business automation enabler for the total Army, i.e., active Army, USAR, and Army NG CSS mission area and will constitute the Army portion of the Global Combat Support System (GCSS). It will support the Force XXI digitized Army, the revolution in military logistics (RML), and will be the catalyst for the CSS automation initiatives which support the AAN. The ICS3 will facilitate situational awareness and will support the CSS functions of manning, arming, fixing, fueling, moving, and sustaining soldiers and their systems.

b. Characteristics: The ICS3 system will consist of functional modules which share log-on, menu screens/windows, compatible hardware, data, software, and communications links. They will be linked into a seamless configuration which maximizes the use of source data automation and minimizes the need for routine human intervention. Communications interfaces and protocols will be integral to ICS3 so that external transmissions will be initiated from within the functional applications. The system will reside on COTS NDI computer equipment. It will have the capability to support worldwide deployment, employment, and sustainment of combat forces in various scenarios and areas of operations, ranging from low to mid and high intensity conflict including stability and support operations (SASO).

c. Requirement/Need/Mission: Required to correct deficiencies of lack of multifunctional. STAMIS using common shared relational database. HQDA approved the MNS on 23 May 95. HQ TRADOC approved the ORD on 5 Feb 97.

3. DTLOMS Area.

a. Primary: Materiel.

b. Secondary: None.

4. CSS E/I Type (Digitization/Modernization (D,M,Both)). Both.

5. CSS BOS Function.

a. Primary: Arm, Fuel, Fix, Man, Distribute, Sustainment Engineering.

b. Secondary: None.

6. FXXI Priority. High.

On the 1996 WFLA list of initiatives for the First Digitized Division. The highest priority within the CASCOM Information Systems Directorate (CASCOM-ISD).

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. High.

[CSS C4 which contained ICS3 was prioritized as #1 out of 51 overall items. ICS3 was prioritized #2 out of 5 overall CSS C4 sub-components]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Briefed.

[This study team observed that HQ TRADOC briefing charts (a) indicated ICS3 was "Green" for having money in the POM or programmed to be in the POM for the "First Division Equivalent" by FY 2000 or before, and (b) recommended an additional \$95.7M by FY 00, and additional \$210M by FY 03, and an additional \$TBD by FY 06 for ICS3. The briefing indicated "Plus-up equips 2 Divisions and connectivity, then fills FP 1 and FP 2 without break in production."]

9. The 1996 US Army Modernization Plan. Reviewed.

[This study team could not specifically find reference to ICS3 in this Plan. However, other capstone programs such as the Standard Army Management Information Systems (STAMIS) Computer Platform and the Total Distribution Program (TDP) were in fact rated by this Plan. They received the following ratings. (a) STAMIS: Amber across the complete review years of FY 96-11 due to "...procurement limitations extending the optimum five year replacement cycle to eight years. Increased funding will allow the five year cycle, and the whole program would be rated Green." (b) Amber across the complete review years of FY 96-11. due to "...Execution of the program will be extended in the FY 97-01 period due to significant funding decrements. The Army will not be able to provide key links in the communication network extending the TAV capability to the tactical logistician. If funding is restored, the program will be rated Green". This study team assumes that ICS3 is covered by one of the above two programs.]

10. Prerequisite(s).

a. FXXI E/Is. None.

b. Other prerequisites. CS

ICS3 will not be on the FBCB2 system/network. ICS3 will fit on the WIN which goes down only as far as Brigade level. Thus, access to communications networks at Brigade and below is needed for ICS3 to be effective. Presently, we use sneaker nets to integrate information from five different STAMIS. ICS3 requires an unclassified digital communication system OR must be able to burrow through a classified system and come out with unclassified information.

11. Overall risk status of

a. Prerequisite E/Is. N/A.

b. Other prerequisites. Unknown.

[SME did not provide information relating to the risk of not gaining access to Brigade and below battlefield communication networks for passing ICS3 information.]

12. Adverse programmatic (peacetime) risks on

- a. The "prerequisite" E/Is if this given CSS E/I is not fielded. N/A.
- b. The other prerequisites. None.

[If ICS3 were not to be fielded, then there would be less workloads imposed on battlefield communication networks.]

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? None.

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? None.

[SME indicated that while "Split Operations" is not a FXXI E/I, the efficient execution of such an operation would definitely benefit from ICS3.]

16. Supporting analytical studies. Yes.

[a. This study team was originally told by the CASCOM ICS3 SME when ICS3 was previously designated as an "initiative" (and not an "enabler") that there would likely be no reductions in manpower requirements due to fielding ICS3, and that the supporting analytical study was a 17 Feb 97 Draft Information System Cost and Economic Analysis (ISCEA) for the ICS3- Phase I Implementation. When observing this Draft ISCEA in Jun 97 this study team noted that the study conclusions and recommendations were left as "To be Written." At that time this study team was advised by the CASCOM SME that it was now the responsibility of the PM office to write these aspects of this study. Lack of resources precluded this study team from ascertaining if this ISCEA was ever completed or approved.

b. In early 1997 TRAC-LEE developed a Benefits Analysis as input to this ISCEA. Selected portions are presented as follows:

(1) Paragraph 3.3b, page 25. "...Manpower Considerations for Alternative (ICS3). The CASCOM SME who provided input to this analysis could identify no manpower reductions resulting from the adoption of Alternative (ICS3). Indications are that the workload would be the same as for the basecase, and the ICS3 design does not reduce the number of operators required to use the system. While the SME project some efficiencies in CSS operations and anticipate some training benefits, they don't believe this system will reduce the number of soldiers required to operate the system. The same is true in maintenance at the CSS Automation Management Office (CSSAMO). It is anticipated that while some training benefits will accrue as a result of Alternative 3 (ICS3), the maintenance personnel will be dealing with the same workload level. This results in NO reduction from the basecase in the number of maintenance personnel required to support this alternative. The bottom line on manpower for Alternative 3 (ICS3) is: (a) no real operator manpower reductions; (b) no potential workload reduction at CSSAMO; however, (c) potential

training reduction at CSSAMO. Since there are only about 400 CSSAMO personnel in the Army force structure, this reduction is considered insignificant in terms of manpower. No reductions in manpower will likely occur as a result of adopting Alternative 3 (ICS3)."

(2) Paragraph 3.3d, page 26. "...Other Economic Benefits of Alternative 3 (ICS3). Although there were no "hard-dollar" savings or manpower reductions that could be identified with this alternative, there are numerous economic benefits that can be attributed to this alternative. These non-dollar benefits account for potential CSS efficiencies to be gained as a result of the ICS3 system." This section then goes on to discuss the potential economic ICS3 benefits in terms of the DTLOMS areas.]

c. Concerning the below (paragraph 17) cited 4 Sep 97 CASCOM email indicating that fielding ICS3 may very well now reduce "25" manpower requirements in the division, this study team is not privy to any supporting analyses for such reduction. However, the SME indicated that the aforementioned analyses do support the ICS3 increases in efficiencies and effectiveness.]

17. Changes in manpower requirements caused by fielding this given CSS E/I. Decrease

[a. CASCOM SME responded during the CEFA interview that "None" was an appropriate response. It was based on SME-MJ.

b. CASCOM's 3 Apr 97 FXXI briefing to CDR TRADOC indicated "...Potential Space Savings: space savings To-Be-Determined. Dependent upon business process reengineering results."

c. The TRAC-LEE analyst performing the aforementioned (paragraph 16b above) ICS3 benefits analysis in early Jan 97 indicated "ICS3 has yet to go past the concept stage...At this time there are no space savings. In fact the concept shows additional servers for the networking. The hope is for a net sum gain of zero."

d. However, based on a 4 Sep 97 CASCOM-ISD email, it appears that analysis is now underway within CASCOM to determine how 25 division-level manpower requirements can be eliminated, due to an idea that property book accounting for the division can be moved back to the Corps. This study team does not know if such move of functions out of the division could then cause any increases in Corps manpower requirements.]

18. Related changes in CSS efficiency. Increase.  
Based on both SME-MJ and the draft ISCEA for ICS3.

[SME indicated that among many anticipated benefits, ICS3 would greatly improve CSS situational awareness with "near real time" visibility of, for example, stockage levels.]

19. Related changes in CSS effectiveness. Unknown.

[During this study team's interview, the SME indicated a response of "To-Be-Determined" as it relates to "effectiveness." Further, the SME did not provide any differentiation between anticipated "efficiencies" and "effectiveness" as expected from the ICS3.]



20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself). None. ICS3 will use existing legacy computers as upgraded (requires a minimum of a 486 computer).

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. N/A.

An Operational Concept is N/A for the ICS3. However, as part of the ISC3 ORD there is an Operational Mode Summary and Mission Profile which suffices.

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. Yes

HQDA approved the MNS on 25 May 95.

b. ORD. Yes.

HQ TRADOC approved the ORD on 5 Feb 97.

c. BOIP. Yes.

BASIS OF ISSUE/TOTAL REQUIREMENTS: ICS3 is not a new start and will initially consist of the current and planned CSS STAMIS and STAMIS locations identified in STAMIS BOIPs under going approval process. A total of 4,884 Servers and 36,321 Workstations are required.

23. CSS E/I training in TRADOC schools. Unknown.

24. Examined in

a. TF XXI AWE (Mar 97). No.

b. TRAC's Div Design Analysis Study. No.

c. The Nov 97 DAWE. No.

25. Tested elsewhere. Yes.

A Unit Level prototype was tested at the 49th Special Troops BN (Ft Lee). Management liked the system. No other actual tests of Phase I (retail level only).

[SME indicated that there was a draft Battle Lab Implementation Plan for ICS3.]

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. Yes.

[SME indicated that (a) "Yes ICS3 is funded", and (b) money is being taken from legacy computer funding lines to pay for ICS3. This study team did not ascertain the adequacy of such funding. No

new computer equipment will be billed to ICS3. As the legacy systems themselves are upgraded, ICS3 will be added.]

27. Planned BOIP (connectivity between FPs). Yes.

Plans call for fielding ICS3 to all four Fps, initially using existing STAMIS BOIP computers.

28. Technical capabilities. Proven.

Yes, ICS3 integrates currently available technology

29. LIA's 15 elements of ILS assessment. Unknown.

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). Yes.  
ICS3 fielding will begin 3rd quarter of FY 99.

b. In time for the First Digitized Corps (2006). Unknown.

c. During FY 07-10. Yes.  
Phase III (last ICS3 phase) will be fielded by 2009.

31. Overall Peacetime (Programmatic) risk. Green.

[a. SME indicated that funding is not a serious issue with the fielding of ICS3, as they "will build to whatever funding is available...ICS3 is not a new system but rather is an evolution of existing systems into an automated composite system. A backup is a part of the ICS3 design."

b. Note: this does not consider any adverse peacetime risks associated with the prerequisite (refer to paragraph 10b above) to have access to battlefield communication networks at brigade and below.]

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.

No impacts that are any different from the basecase legacy computer equipment. ICS3 will be subjected to the standard network computer threat. ICS3 would be susceptible to jamming interference and interception. ICS3's RAM is equal to that of similar COTS items, and is dependent on whatever the PM TACMIS procures.

33. Likelihood of prerequisite C,CS or CSS E/I wartime degradation. Unknown.

[SME indicated that there were no prerequisite "FXXI E/Is." However, SME did indicate that ICS3 requires access to Brigade and below battlefield communication networks for passing information. No information was made available to estimate the likelihood of this required communication network being degraded during wartime.]

34. Wartime backup (BU) system. A BU system is part of the ICS3 design effort. Also, if need be, we could always revert to manual processes. The ICS3 ORD has requirements for built-in

redundancies. Further, ICS3 is a distributed data base system, and the database can be replicated at several different places.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. N/A.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available.  
Low.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. None.  
The ORD requires that ICS3 interface with existing legacy systems, or we may have to replace/upgrade certain older legacy systems.

38. Other adverse wartime impacts (e.g., scenario dependent). None.

39. Overall wartime risk associated with employment of this CSS E/I. Green.

40. Overall risk (considering both programmatic and wartime risks). Green.

41. Ordinal ranking of this CSS E/I by the CSS DCDs.

42. Cardinal ranking of this CSS E/I by the CSS DCDs.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities.

44. Remarks. None

45. Data Sources. LTC Starkey, CASCOM (ISD), DSN: 687- 0284. CASCOM Sep 96 CSSMMP and related May 97 updates. CASCOM (ISD) 4 Sep 97 email, subject: Division Redesign...ICS3 Savings.

1. Title: Interactive Electronic Technical Manuals (IETM)- A Tactical Interactive Ground Equipment Repair Initiative (TIGER)

2. Designation: FXXI CSS Initiative.

However, IETM may transition to enabler status by 2000. Having this capability will save time and focus maintenance efforts to the extent that current force structure cuts in the DISCOM should be overcome (provided there is a concomitant improvement in logistics processes).

a. IETM will operate on laptop computers and Personal Digital Assistants (PDA) (initially supported a wireless modem linked server). This PDA is referred to hereafter as the PUMA. PUMA-or the laptop computer-provides the IETM video display, input/output capabilities (I/O), diagnostic interface with weapons systems and other equipment (through attached Automated Breakout Box (ABOB), and short range communications (voice and digital). PUMA will be connected by wireless link to a nearby computer server (located on the maintenance vehicle, in the motor pool, or at the designated maintenance collection point. The server is linked to FBCB2, over which prescribed logistics communications are passed to the division's logistics structure, and to the ICS3. ICS3 will provide the IETM with automated repair parts identification and ordering.

b. IETM must be designed to diagnose and direct how to fix complicated broken, or malfunctioning equipment. These actions have to be immediate and accurate. Because it is expensive and complicated, the IETM should be restricted to troubleshooting specific problems that inhibit combat performance of critical weapon systems, or to diagnosing designated high-maintenance cost drivers. In most cases, these are synonymous.

c. But simply improving diagnostics, or even prognostics, is not enough. Alone, these capabilities may determine exactly what is wrong; exactly what repair part is needed, and exactly how to fix what is broken. But alone, great troubleshooting capabilities won't direct services to the customer, order and locate the correct repair part; reorder replacement stockage, and route and track the repair part to the user. This signifies that the IETM must have transparent access to the ICS3.

d. To attain the precision and speed that materiel maintenance requires to support modern and future military operations, our diagnostics systems must be capable of communicating-and interacting-with both their designated weapon systems, and with the supporting tactical and operational logistics apparatus. Designed to operate within an integrated tactical logistics system, the diagnostic device initiates the repair process. Normally, this occurs at the unit level. Here accurate diagnoses are most needed and effective. This is where "Velocity Management" begins!

e. To employ IETM effectively, the Army requires an interface device that communicates seamlessly with the weapon system, yet connects with FBCB2, the CSSCS, ICS3, or other available communications systems. This interface device should be hand held, rugged, and small enough to fit into the knee pocket of the battle dress uniform (BDU), or into that of the mechanic's overalls. The modern PDA offers an appropriate technological basis. PDA-currently available in the commercial market-come in a variety of shapes and configurations. The diagnostic PDA, hereafter referred to as the pocket unit maintenance aid, or PUMA, would serve as the Unit Maintenance (UM) mechanic's diagnostic instrument, wireless communicator, record keeper, parts requisitioning device, and information window. The PUMA would display ETM, IETM, and other

necessary information sources. It would access ICS3, and Digital Interactive Training (DIT). What it cannot accommodate on its own operating system, it would access-by wireless modem-from a nearby server located in the maintenance vehicle, in the motor pool, or at the repair facility. (Even as this is being written, technology is offering alternatives to local servers: Direct communications-by cellular, satellite, signal amplification, or re-transmitter. Network Computing (NC) principles also are compelling, and may provide the best means to manage large, complicated automated information systems operating over mobile wireless networks.) Of course, process and technology proposals would be submitted to comprehensive user's evaluation and acceptance before recommending procurement.

f. The IETM is but a component-albeit, a vital component-of what must be a completely integrated, digital electronic combat service support system.

### 3. DTLOMS Area.

a. Primary: Materiel.

b. Secondary: Doctrine.

Because IETM will contribute to automating materiel maintenance diagnostics and repair parts requisitioning in tactical units. This will result in fundamental changes to extent logistics practices. IETM will obviate-or significantly reduce training requirements on complicated, high tech weapon systems and their components.

### 4. CSS E/I Type. (Digitization/Modernization (D, M, Both)). Both.

IETM are digital media that modernize training, maintenance and logistics practices. Guidance and thrust are summarized in an IETM Strategic Plan currently awaiting DCSLOG signature. The IETM Concept and Action Plan has been drafted and will be submitted to HQ TRADOC for approval upon completion of local staffing.

### 5. CSS BOS Function.

a. Primary: Fix.

b. Secondary: Distribute.

Directs distribution of repair parts to the user; initiates order for repair parts; ensures that repair parts are located, tracked, and delivered to the user.

### 6. FXXI Priority. High.

SME evaluation based on DCSLOG and Chief of Ordnance interest.

### 7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. None.

[IETM was not listed in this plan.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed.

[Was not briefed by HQ TRADOC to ODCSOPS as a system requiring additional funds.]

9. The 1996 US Army Modernization Plan. Not Reviewed.

10. Prerequisites

a. FXXI E/Is. CSS.

[The IETM SME responded that there were no prerequisites. However, the SME for ETM said that "without the ETM, the IETM concept cannot exist." This study team tends to agree with the ETM SME, and therefore assigned a "CSS" answer above.]

b. Other prerequisites. CS.

The maintenance system must have compatible radios and computers on all tactical maintenance vehicles in order to receive and use IETM information. IETM (and ETM) will not be loaded on the PUMA, but accessed through a server. The server (located on the tactical maintenance vehicle) will be the gateway to FBCB2. ICS3, least initially, will then be accessed through FBCB2.

11. Overall risk status of

a. Prerequisite E/Is. Medium

[The ETM CEFA assessment indicated an overall "Amber" rating for ETM due to lack of funds.]

b. Other prerequisites. Unknown

[a. SME responded "Low for equipping all tactical maintenance vehicles with FBCB2 capable radios; Low-for diagnostic access ports on existing weapon systems and vehicles (many are equipped with bus ports (J-1708, MIL-STD-1553), STE ports, RS-232 ports, or test ports, such as that on the AGT-1500 gas turbine engine on the M1A1/A2 main battle tank. Circuits on older systems and items can usually be diagnosed through hookups at strategic points in the electrical system. Breakout boxes (BOB), and automated BOB are available as an electronic interface between some diagnostic systems and the equipment to be diagnosed. The Turbine Engine Diagnostics (TED) system is a proven IETM surrogate that will serve as the Army's test and evaluation demonstrator.

b. However, it is not clear to this study team if the existence of such other prerequisites (e.g., the CMT and FRS-H having FBCB2 capable radios) has been coordinated/planned/funded. SME CEFA responses for the CMT and FRS-H did not indicate that they "required" such FBCB2 connectivity. Thus, this study team elected to assign an "Unknown."]

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. None.

b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function. None.

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? Specify.

[SME indicated "None" but this study team thinks that the Multicapable Maintainer and certainly the PUMA will "benefit" by IETM fielding. It was not completely clear to this study team if the PUMA "required" IETM (read "the PUMA could not operate without"). However, given the PUMA description as provided for the PUMA CEFA, this study team concluded that without ETM/IETM the PUMA could still function as a maintenance aid.]

16. Supporting analytical studies. Yes.

COEA was sponsored by LIA, but its contents are not known by SME.

17. Changes in manpower requirements caused by fielding this given CSS E/I. None.

But they are possible later.

[This study team assumed that the SME meant "decreases."]

18. Related changes in CSS efficiency. Increase.

IETM are key to establishing off-system anticipatory maintenance of weapon systems and other items in combat, combat support, and combat service support units. IETM are the enablers for accurate diagnostics that are required to establish VM.

19. Related changes in CSS effectiveness. Increase.

The acquisition and subsequent materiel development of this software and associated components will improve readiness in tactical units, because IETM will provide the supporting mechanics an immediately available means to diagnose equipment (PUMA is the host for IETM and ETM, provides the IETM access to essential logistics information, permitting automatic ordering of the requisite repair parts (over ICS3). Greatly improved diagnostics, information and logistics communications should increase OR rates significantly, but this must be demonstrated.

20. Related force structure (equipment and/or organizational) changes

a. In equipment (other than the equipment associated with the given CSS E/I itself). None.

[Impact on requirement for tactical maintenance vehicles to have FBCB2 compatible radios in unknown.]

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Developed.

IETM are included in the draft TIGER concept, the final draft of which is being prepared for submission to HQ TRADOC. A draft IETM Concept and Action Plan also have been prepared. There is a DCSLOG sponsored IETM Strategic Plan.

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. N/A.

MNS is not required.

b. ORD. Unknown.

[No information obtained from SME.]

c. BOIP. N/A.

IETM will be distributed as publications pertaining to weapon system technical information.

23. CSS E/I training in TRADOC schools. No.  
Not yet.

24. Examined in

a. TF XXI AWE (Mar 97). No.  
Unfunded during TF XXI preparations.

b. TRAC's Div Design Analysis Study. No.

c. The Nov 97 DAWE. No.

25. Tested elsewhere. No.

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. Unknown.

[SME responded "Yes, but mostly 'in name only.' PATRIOT and PALADIN have purchased so-called IETM, but these do not interact with STAMIS or diagnose the weapon system. Also, additional CASCOT budgeting information indicated "Unknown." Based on this information, this study team assigned an "Unknown."]

27. Planned BOIP (connectivity between FP). N/A.  
IETM will be issued as weapon system dedicated TM.

28. Technical capabilities. Proven.  
IETM leverage commercial efforts already accomplished, as well as efforts from the ARL TED system. Currently TED is being "miniaturized" to become PUMA for non-digital electronic engine



control units (ECU) on AGT-1500 gas turbine engines. It is also being developed to monitor and diagnose digital electronic engine control units (DECU).

29. LIA's 15 elements of ILS assessment. Not Assessed.

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). No.

b. In time for the First Digitized Corps (2006). Unknown

[SME responded "Yes, this is contingent on successful proof-of-principle and funding." Based on this response and above funding information, this study team elected to assign an "Unknown."]

c. During FY 07-10. Unknown

[SME responded "Yes, contingent on funding." However, based on all of the above this study team elected to assign an "Unknown."]

31. Overall Peacetime (Programmatic) risk. Red.

[SME indicated "Amber. Some funding for IETM is available now through various weapon system project managers. LIA has submitted a UFR for developing IETM for legacy systems." Also note that the ETM prerequisite is rated "Amber" in its CEFA assessment due to lack of funds. Notwithstanding the fact that technical capabilities of IETM are proven, there is uncertainty about the status of the ORD and overall funding, plus there has been no IETM field testing. Therefore, this study team assigned a "Red."]

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.

Threat: same as that for other software employed in tactical units. RAM failure: unlikely.

Electromagnetic Spectrum: same as for other software in tactical units. The threats to IETM are related to those of the host systems and vehicles (CMT, FRS, M-88A1/A2, M113A1/A2). Because most, excepting the M88 and the M113, are not likely to be threatened by direct fire, IETM are susceptible only to those dangers characteristically associated with other combat support, and combat service support vehicles.

33. Likelihood of prerequisite C,CS or CSS E/I wartime degradation. High.

[a. ETM is assessed in the ETM CEFA as having a "Low" likelihood of wartime degradation.]

b. Concerning the CMT and FRS-H vehicles. SME indicated in paragraph 32 above "...The threats to IETM are related to those of the host systems and vehicles (CMT, FRS-H, M-88A1/A2, M113A1/A2). Because most, excepting the M88 and the M113, are not likely to be threatened by direct fire, IETM are susceptible only to those dangers characteristically associated with other combat support, and combat service support vehicles." Thus, it is estimated that both the CMT and

FRS-H are "not likely to be threatened by direct fire." Also, both the CMT and FRS-H CEFA assessments indicated their likelihood of wartime degradation as "Low."

c. However, the IETM requires that these vehicles have functioning FBCB2-CSS Functionality radios aboard. It should be noted that in his CEFA assessment for the likelihood of its wartime degradation, the CASCOM SME for "FBCB2-CSS Functionality" stated as follows: "High. Not yet tested, but anytime you become largely dependent on radio communications, the threat will always find a way to disrupt your communications, and wreck havoc on your plans."

d. Thus, given all of the above this study team elected to assign a "High" to this response.]

34. Wartime backup (BU) system. Return to manual diagnostics and repair parts ordering.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. N/A. There likely will always be some form of available manual backup system.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. Medium.

The quality of backup services will be related to the amount of training and experience possessed by the available operators, crew, and maintenance personnel. They must be competent in applying appropriate battle damage assessment and repair.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Medium.

Limits units not receiving IETM to current capabilities. Lacking the accurate diagnostics and reporting capabilities associated with IETM, it is likely that weapon systems not supported by IETM would exhibit reduced operational readiness.

38. Other adverse wartime impacts (e.g., scenario dependent). None.

39. Overall wartime risk related to employment of this CSS E/I. Amber.

[SME responded "Green." However, given (a) the present assignment of a "High" risk associated with the likelihood of the FBCB2-CSS Functionality's performance being degraded in wartime, as well as the "Medium" risk associated with having to revert to a manual system if the IETM cannot function during wartime, this study team elected to assign an "Amber." "Red" was felt inappropriate given the IETM SME's assignment of the "Medium" (Amber) risk if we had to revert to a manual wartime system.]

40. Overall risk (considering both programmatic and wartime risks). Red.

Due to uncertainty of funding and status of the ORD, and lack of field testing.

41. Ordinal ranking of this CSS E/I by the CSS DCD.

42. Cardinal ranking of this CSS E/I by the CSS DCD.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities. N/A- IETM was not mentioned in the 1996 CSSMMP.

44. Remarks. None

45. Data Sources. Mr. William Kasper, CASCOM DCD-Ordnance, DSN: 687-0255.

1. Title. Laundry Advanced System (LADS).

2. Designation. FXXI CSS Enabler.

a. Description: There are two laundries currently under development. The Laundry Advanced System (LADS) is a semi-aqueous laundry for field use. The Containerized Self Service Laundry (CSSL) is a containerized (ISO) laundromat for use by soldiers. The CSSL enables soldiers to launder their own clothing.

b. Characteristics: The LADS consists of two machines mounted on a flatrack. It is powered by a 30kw generator. The system weighs 18,000 lbs. Two personnel are required to operate the laundry. It can process up to 400 pounds per hour. The CSSL is composed of commercial laundry equipment mounted inside of an ISO container. All ancillary equipment, to include pumps, hoses, a softwall shelter, and water storage bladder are included with the system. The CSSL will be operated and maintained by unit personnel (MOS immaterial).

c. Requirements/Need/Mission: The Army requires a laundry to replace the current M-85 laundry. The unit must reduce the number of personnel required to perform laundry and reduce the amount of water consumed by the laundry unit. The LADS is being designed to replace the M-85 laundry on a four for one basis. It will reduce manpower by 75%, and requires only 300 gallons per 10 hour shift (20 hours of operation/recycles water) compared with 24,000 gallons of water for the same support provided by M-85's. The need for the CSSL was demonstrated during Operation Desert Storm and other recent deployments. This quality of life improvement allows units in isolated locations or in the realm of humanitarian aid, and disaster relief missions to maintain the capability to wash personal items above and beyond a bucket, soap, and water.

3. DTLOMS Area.

a. Primary: Materiel.

b. Secondary: None.

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Modernization.

5. CSS BOS Function.

a. Primary: Man.

b. Secondary: None.

6. FXXI Priority. High.

[SME referenced the Sep 96 CASCOM CSSMMP.]

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. Medium.

[In Paragraph 6 above, the CASCOM SME indicated "High" and cited the Sep 96 CASCOM CSSMMP. However, in this Plan 51 different items are prioritized, and LADS is prioritized #18. This study team merely divided the #51 by 3 (three areas: High, Medium and Low) to get three ranges; i.e., High (1-17), Medium (18-34), and Low (35-51). Thus, this study team assigned a priority of "Medium." Note: that within the QM proponentcy, there were 24 prioritized items. LADS was prioritized #5 out of these 24 QM items.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed.

9. The 1996 US Army Modernization Plan. Reviewed.

[The Laundry and Dry Cleaning System was reviewed on page 1-9 of this Plan under the "Sustain The Force-CSS Equipment Section." Its description is identical to the CASCOM LADS fact sheet provided this study team. Also, paragraph 22b below discusses where changes to the LADS FY 94 ORD were approved in Dec 96 which deleted the "dry cleaning" requirement, thereby causing this system to be 100% water-based. Therefore, this study team assumes that the Laundry and Dry Cleaning System as reviewed in this Plan is the LADS. This Plan rated the CSS Equipment program as "Amber" for the near term (FY 96-98) since "funding shortfalls have delayed the research and development of the Laundry and Dry Cleaning System...." This Plan then rates the mid-and far-term (FY 99-01 and FY 02-11 respectively) as "Amber" since "Mid-and far-term funding is not sufficient to carry out planned field and food service equipment and soft shelter modernization program."]

10. Prerequisite(s).

- a. FXXI E/Is. None.
- b. Other prerequisites. None.

11. Overall risk status of

- a. Prerequisite E/Is. N/A.
- b. Other prerequisites. N/A.

12. Adverse programmatic (peacetime) risks on

- a. The "prerequisite" E/Is if this given CSS E/I is not fielded. N/A.
- b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function?  
None.

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? None.

[SME indicated however that the Modular Field Service Company would benefit greatly by employing this new system.]

16. Supporting analytical studies. Yes.

[SME responded that a COEA-type analysis was performed in 1993 and approved. However, the SME further indicated that no COEA-type analysis was required, and cited a 20 May 93 message issued by the then TRADOC CDR, subject: Cost and Operational Effectiveness Analysis. This message established that "COEA guidance should state that in those instances when (a) COEA is required for ACAT III/IV systems, it will only include: (1) a description of program costs as routinely prepared.... (2) a single page explanation of the benefits to be derived from the program, not a summary of expanded effectiveness analysis done and reported elsewhere. This guidance will prevail unless HQDA directs otherwise for special cases...."]

17. Changes in manpower requirements caused by fielding this given CSS E/I. Decrease.  
The Army will realize a reduction of 260 manpower requirements across the entire force.

18. Related changes in CSS efficiency. Increase.  
There will be a 95% reduction in the amount of water need by the LADS as compared to the current M85 system.

19. Related changes in CSS effectiveness. Increase.  
The new LADS will clean 400 lbs., of clothing in one hour compared to 100 lbs., for the current M85 system.

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself). None.

[SME indicated that there would not be any major changes in equipment; however, he indicated that there may be some ancillary savings/decrease in water storage containers and other equipment needed to treat dirty water. This could not be quantified at this time.]

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Developed.  
Concept was approved 28 Feb 94.

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. Yes.  
MNS including an Operational & Organizational Plan was approved 6 Oct 93.

b. ORD. Yes.

ORD was approved in FY 94. Changes to this ORD which deleted the "dry cleaning" requirement thereby causing this system to be 100% water-based were approved Dec 96.

c. BOIP. No.

Not yet. BOIP/TOTAL REQUIREMENT: LADS will be issued to each field service company at 6 laundries per unit. Additional LADS units will go to medical units and the Quartermaster School.

23. CSS E/I training in TRADOC schools. No.  
LADS is not yet fielded.

24. Examined in

a. TF XXI AWE (Mar 97). No.

b. TRAC's Div Design Analysis Study. No.

c. The Nov 97 DAWE. No.

25. Tested elsewhere. Yes.

Proof of Principle Prototype test proved technical feasibility. LADS will be further tested at Aberdeen Proving Grounds, MD. during the first quarter of FY 98.

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. Yes.

216 LADS are required for all Field Service Companies for all four FP. The requirements for 42 LADS for FP 1 and 42 LADS for FP 2 are fully funded in FY 98-03. The requirement for another 132 for FP 3 and FP 4 is covered by the EPP. PROGRAM FUNDING: MDEP RJS2; LADS estimated unit cost is \$420,000.00.

27. Planned BOIP (connectivity between FP). Yes.

Plans call for fielding the LADS to every Field Service company in all four FP.

28. Technical capabilities. Proven.

Proof of Principle Prototype test proved technical feasibility. LADS will be further tested at Aberdeen Proving Grounds, MD. during the first quarter of FY 98.

29. LIA's 15 elements of ILS assessment. Assessed.

[SME indicated that at the last In Process Team Review, the PM for the system indicated that all ILS elements were rated "Green." Also, this study team was able to determine that OPTEC did conduct an ILS review for the LADS. However, limited study time precluded any further attempts to acquire their assessment.]

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). Yes.

[SME responded "No. LADS is an EAD system (for Field Service Companies)." However, based on information in paragraph 26 above, this study team assumes that LADS will likely be fielded to Corps units "to support" the First Digitized Division. Therefore, this study team assigned a "Yes."]

b. In time for the First Digitized Corps (2006). Yes.  
FUE will be FY 2000.

c. During FY 07-10. Yes.  
Complete LADS fielding is expected by FY 2010.

31. Overall Peacetime (Programmatic) risk. Green.  
Funding is available and all ILS elements are rated "Green."

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.

33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation. N/A.

34. Wartime backup (BU) system. LADS BU systems could include washing clothes by hand, the use of the Logistics Civil Augmentation Program (LOGCAP) or Host Nation Support (HNS), or even use of the CSSL which also will be fielded during this time period.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. N/A.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available.  
None.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. None.  
Units not receiving this LADS would still have the current system available to them. However, plans call for fielding LADS to all four FP.

38. Other adverse wartime impacts (e.g., scenario dependent). None.

39. Overall wartime risk associated with employment of this CSS E/I. Green.

40. Overall risk (considering both programmatic and wartime risks). Green.

41. Ordinal ranking of this CSS E/I by the CSS DCD.

42. Cardinal ranking of this CSS E/I by the CSS DCD.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities.

44. Remarks. None



45. Data Sources. Mr. Jon Walker, CASCOM (DCD-QM Dir), DSN: 687-0613. CASCOM's Sep 96 CSS MMP and related May 97 updates.

1. Title. Life-Time Oil Filter (LOF).

2. Designation. FXXI CSS Initiative.

a. Description: LOF is a oil filter replacement concept to traditional canister or spin on oil filters. The manufacturer can make an adapter plate for the installation of their filter on any equipment. Filters have the ability to filter contamination down to the 1 micron level, which is a significant improvement over existing filtering systems. Filters require serve every 100K miles; consisting of disassembly and washing with solvent. The complete process can be completed in less than 30 minutes.

b. Benefits: The goal of LOF is to accomplish the following: Primary filtering of oil in engines, transmissions and hydraulic systems, reduce the time and effort expended replacing oil filters, eliminate costs associated with replacing and stocking oil filters and reduce hazardous waste. Life-Time Oil Filters are a canister based filter that use centrifugal force and normal engine pressures to keep the inner filter free of contamination. The outer portion of the canister collects and isolates waste for easy discharge of contaminated material.

c. Cost: Seed money in place through CEP. Filters sets for one vehicle cost \$645.00; this price drops, considerably, as quantities increase. Basis of issue will be one per vehicle exceeding 12,000 GVW; estimate number at 32,000.

d. Current Status: LOF is an approved FY 97 TRADOC CEP. Testing is scheduled to begin 3QTR FY97 at the National Training Center using 8V92TA engines. Anticipate additional testing, under CEP, in FY 98 using different model engines.

3. DTLOMS Area.

a. Primary: Materiel.

b. Secondary: None.

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Modernization. Vehicles will be equipped with permanent oil filters.

5. CSS BOS Function.

a. Primary: Fix.

b. Secondary: None.

6. FXXI Priority. Low.

LOF is in its initial stage of development. Testing has not started, but it is will be a NDI for the Army using fully developed COTS technology.

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. Medium.

[LOF was prioritized #28 out of 51 items. Also, LOF was prioritized #13 out of 21 Ordnance items.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed.

9. The 1996 US Army Modernization Plan. Not Reviewed.

10. Prerequisite(s).

a. FXXI E/Is. None.

b. Other prerequisites. None.

11. Overall risk status of

a. Prerequisite E/Is. N/A.

b. Other prerequisites. N/A.

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. N/A.

b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? None.

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I?. Specify.

[SME responded "None." However, this study team thinks that in some indirect way all systems (perhaps some designated "FXXI enablers/initiatives") employing this LOF will "benefit" from not having to be pulled off the line for oil changes.]

16. Supporting analytical studies. None

No analysis performed as it is too early in LOF development cycle.

17. Changes in manpower requirements caused by fielding this given CSS E/I. Unknown.

It is too early in the LOF development life cycle, but it is likely that maintenance manhours can be reduced due to LOF employment. However, this reduction in manhours may not necessarily result in any reduction(s) in manpower requirements.

18. Related changes in CSS efficiency. Increase.

LOF will provide increased filtration. Refer to paragraph 2b above.

19. Related changes in CSS effectiveness. Increase.

LOF will reduce the time to perform services.

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself). None.

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Not Developed.

Part of the Ordnance XXI Vision that still is under development.

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. N/A.

None needed.

b. ORD. No.

We do not know if an ORD will be needed. CASCOR is still investigating this.

c. BOIP. No.

Not yet developed. But, plans call for the basis of issue to be one per vehicle exceeding 12,000 GVW; estimate number at 32,000.

23. CSS E/I training in TRADOC schools. No.

Not yet, too early in the LOF development cycle.

24. Examined in

a. TF XXI AWE (Mar 97). No.

b. TRAC's Div Design Analysis Study. No.

c. The Nov 97 DAWE. No.

25. Tested elsewhere. No.

An approved FY 97 CEP will test the LOF at the NTC in Jul 97 on the M1070 (Heavy Equipment Transporter [HET]).

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. No.

The LOF has not yet been submitted for funding. It still requires testing.

27. Planned BOIP (connectivity between FP). Unknown.  
Too early yet.

28. Technical capabilities. Proven.  
Proven in the commercial world. The LOF will be a NDI for the Army using COTS technology.  
But, the LOF needs testing in an Army operational environment.

29. LIA's 15 elements of ILS assessment. Not assessed.  
Too early.

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). No.

[SME responded "To Be Determined-LOF is still under development." However, based on above answers, this study team thinks that a more likely response is "No."]

b. In time for the First Digitized Corps (2006). Unknown.

c. During FY 07-10. Unknown.

31. Overall Peacetime (Programmatic) risk. Red

[SME responded "Amber. Needs funding and Army testing." However, the ORD status is still unknown, the concept is not developed, and there is a complete lack of funds. Notwithstanding the fact that the technical capabilities are proven (NDI/COTS), based on the above, this study team assigned a "Red."]

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.

33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation. Low.

[Same as any other CL IX item.]

34. Wartime backup (BU) system. Only BU would be the replacement by another LOF (a CL IX item).

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. N/A.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. Low.  
Same impact associated with waiting for any CL IX replacement.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Low.  
Units without the LOF will not experience the planned LOF efficiencies.

38. Other adverse wartime impacts (e.g., scenario dependent). None.

39. Overall wartime risk associated with employment of this CSS E/I. Green.

40. Overall risk (considering both programmatic and wartime risks). Red.

[Refer to paragraph 31 above.]

41. Ordinal ranking of this CSS E/I by the CSS DCDs.

42. Cardinal ranking of this CSS E/I by the CSS DCDs.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities.

44. Remarks. None.

45. Data Sources. CW3 Slaughter, CASCOM (DCD- Ord Dir), DSN: 687-0595. CASCOM Sep 96 CSSMMP and related May 97 updates.

1. Title. Lightweight Disposable Dearmer (LIDD).

2. Designation. FXXI CSS Initiative.

a. Description: The LIDD is a lightweight, one-shot device used in large quantities by EOD technicians to neutralize unexploded ordnance (UXO). Multiple LIDD's can be rapidly emplaced by a single EOD soldier in the highly UXO contaminated environments resulting from modern combat operations.

b. Characteristics: The LIDD consists of a prepackaged energetic tool (ET), a demolition material interface adapter, and an emplacement stand. It has a minimal setup time, interfaces with current common demolition materials, and requires no maintenance. The LIDD disrupts the firing train of the UXO by suddenly removing or disabling the fuse.

c. Requirement/Need/Mission: A broad need exists to eliminate hazards from UXOs which jeopardize operations conducted in support of national military strategy. The density of UXO resulting from modern combat operations is much higher than in previous conflicts. Mass contamination of an area by cluster munitions, sub-munitions, or area denial munitions with a variety of fusing systems would have a major impact on operations. A specific need exists for the EOD soldier, during a single approach, to quickly neutralize large quantities of threat UXO by disrupting the firing train.

d. Milestones: Milestone I/II 1st QTR FY 98.

3. DTLOMS Area.

a. Primary: Materiel

b. Secondary: None.

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Modernization.

5. CSS BOS Function.

a. Primary: Arm.

b. Secondary: None.

6. FXXI Priority. High.

Per the 1 May 97 Ordnance Vision for FXXI. Also, the LIDD has a high priority within the US Navy.

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. Low.

[The LIDD was prioritized #49 out of 51 systems. Also, the LIDD was prioritized #20 out of 21 Ordnance systems.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed.

9. The 1996 US Army Modernization Plan. Not Reviewed.

10. Prerequisite(s).

a. FXXI E/Is. None.

b. Other prerequisites. None.

11. Overall risk status of

a. Prerequisite E/Is. N/A.

b. Other prerequisites. N/A.

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. N/A.

b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? None.

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? None.

16. Supporting analytical studies. Yes.

A COEA was performed in Apr 95 by the US Navy EOD Technical Division, Indian Head, MD. This analysis was approved by the Joint Service EOD Program Board.

17. Changes in manpower requirements caused by fielding this given CSS E/I. None.

18. Related changes in CSS efficiency. Increase.

Increased safety and disposable capability.

[This increase in efficiency is based on SME-Military Judgment. This program is between MS 0 and MS I, and there have been no Developmental or Operational testing yet.]

19. Related changes in CSS effectiveness. Increase.

Increase in effectiveness is expected as based on the planned concept, but not yet demonstrated. The LIDD can simultaneously render safe multiple pieces of ordnance items; whereas the current MARK II dearmmer can work on only one piece at a time.



20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself). None.

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Developed.

Approved and published in FM 9-15.

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. Yes.

Approved; date unknown. MNS M043-85-93 for Explosive Ordnance Disposal (S).

b. ORD. Yes.

ORD USN 440-85-96. Approved by the Joint Service EOD Program Board, Apr 97.

c. BOIP. N/A.

BOIP/TOTAL REQUIREMENT: The LIDD is an expendable item of Supply Class V. Initial estimate is for 10,000 with continuing purchases based on annual consumption rates.

23. CSS E/I training in TRADOC schools. No.

Not yet, as the LIDD is not fielded.

24. Examined in

a. TF XXI AWE (Mar 97). No.

b. TRAC's Div Design Analysis Study. No.

c. The Nov 97 DAWE. No.

25. Tested elsewhere. No.

The LIDD will be tested in the 4th quarter of FY 97.

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. Yes.

The Navy is providing RDT&E funds (RDTE: FY 97-\$584K, FY 98-\$760K, FY 99-\$1340K. OPA funds: FY 01-\$2713K, FY 02-\$121K, FY 03-\$121K. These funds will be sufficient to cover the expected LIDD requirements of all EOD units. (EOD units are only in FP 1 and 2.)

27. Planned BOIP (connectivity between FP). N/A.

LIDD is an expendable CL V item. Initial requirement estimate is 10,000 with subsequent procurements based on annual consumption rates.

28. Technical capabilities. Proven

In computer modeling only.

29. LIA's 15 elements of ILS assessment. Unknown.

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). No.

[SME responded "No." Based on this response and the funding information contained in paragraph 26 above, this study team therefore assumed that LIDD would not be fielded to Corps EOD units in time "to support" the First Digitized Division.]

b. In time for the First Digitized Corps (2006). Yes.

c. During FY 07-10. N/A.

LIDD will be available to the entire Army before FY 07.

31. Overall Peacetime (Programmatic) risk. Amber.  
Lack of testing.

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.  
LIDD is a CL V item.

33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation. N/A.

34. Wartime backup (BU) system. We currently have available the MARK II dearmmer (Model One). The Army will continue to use this dearmmer even after fielding of the LIDD. Thus, a BU system for the LIDD could very well be use of an available MARK II.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. N/A.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. Medium.

[SME responded "N/A." However, this study team thinks that use of the MARK II and its decreased effectiveness (when compared to that planned for the LIDD), coupled with the planned intensity of the FXXI battlefield would impose a Medium risk to our EOD units, and slow down the rate of advance of maneuver commanders. Thus, this study team assigned a "Medium" answer.]

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Medium.  
If the LIDD were not procured in sufficient quantities, then selected EOD units could not rapidly clear areas contaminated with multiple unexploded ordnance (OVO) items. (However, plans do call for procuring sufficient quantities of the LIDD for all EOD units.)

[Based on the above SME response, this study team assigned a "Medium" answer.]

38. Other adverse wartime impacts (e.g., scenario dependent). N/A.  
Decreased capability for EOD units to respond to UXO that threaten the maneuver commander's combat power and lines of communication.

[The SME responded as provided above. This study team thinks that his response better fits the question asked in paragraph 37 above. Thus, this study team thinks that a "N/A" is an appropriate response.]

39. Overall wartime risk associated with employment of this CSS E/I. Green.

40. Overall risk (considering both programmatic and wartime risks). Amber.  
Lack of testing.

41. Ordinal ranking of this CSS E/I by the CSS DCDs.

42. Cardinal ranking of this CSS E/I by the CSS DCDs.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities.

44. Remarks. None

45. Data Sources. MSG Frey, CASCOM (DCD-Ord Dir), DSN: 687-0566. CASCOM Sep 96 CSSMMP and related May 97 updates.

1. Title. Lightweight Maintenance Enclosure (LME).

2. Designation. FXXI CSS Initiative.

a. Description: The Lightweight Maintenance Enclosure is approximately a 20'w X 32'l X 13'h Forward Area Maintenance Shelter.

b. Characteristics: The LME will provide maintainers the capability to perform maintenance on the battlefield under all environmental conditions.

- uses state-of-the-art vinyl-coated polyester fabric.
- lightweight aluminum frame.
- reduced overall weight of 1700 lbs. versus 3294 lbs.
- less labor intensive to erect/strike.
- internal dimensions adequate to support limited overhead lifting operations.
- increased blackout capabilities.

c. Requirement/Need/Mission: A requirement exists for a highly mobile, lightweight enclosure system for repair and maintenance of tracked and wheeled vehicles in the Unit Maintenance Collection Point, Brigade Support Area, and Tactical Assembly Area of the battlefield. The LME will provide protection for personnel and equipment from the debilitating effects of continuous exposure during maintenance/repair procedures in all climatic conditions. The doctrine to repair as far forward as possible justifies the need for the LME. This need is addressed in the Defense Planning Guidance, Fiscal Year 1996-2001, which states that readiness programming will reflect the "first to fight" principle. This requires units to maintain appropriate levels of maintenance. Maintenance is an overall readiness posture. It also states that services must continue to maintain excellence in facilities. Maintenance enclosures will improve the quality of life for soldiers in a field environment. The current maintenance tent is too heavy (3294 lbs.) bulky & too time consuming to erect/strike, (4 men - 5 hours); it has poor blackout capabilities; is not camouflaged and hinders inside maintenance performance. Because of size and weight, the current tent is not adaptable to future warfighting doctrine. The LME is approximately 20'w X 32'l X 13'h, uses state-of-the-art vinyl-coated polyester fabric and a lightweight aluminum frame, thus reducing overall weight (1700 lbs.). The LME is less labor intensive to erect/strike, (12 men-1 hour); has an increased work space, and cost less than the current tent.

3. DTLOMS Area.

a. Primary: Materiel.

b. Secondary: None.

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Modernization.

5. CSS BOS Function.

- a. Primary: Fix.
- b. Secondary: None.

6. FXXI Priority. Low.  
Based on SME-Military Judgment.

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. Low.

[LME was prioritized 345 out of 51 items. Also, it was prioritized #16 out of 21 ordnance items.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed.

9. The 1996 US Army Modernization Plan. Reviewed.

[Page I-10 of the Sustain The Force section (CSS Equipment) of this Plan discussed the LME. "... Soft shelters provide protection from climatic extremes as well as battlefield threats, while minimizing weight and volume...Current programs include the...Lightweight Maintenance Enclosure....This program (CSS Equipment) is rated "Amber" for near-, mid-, and far-terms (FY 96-11). Funding shortfalls have delayed the research and development of the ...soft shelter programs. Mid-and far-term funding is not sufficient to carry out planned field and food service equipment and soft shelter modernization program."]

10. Prerequisite(s).

- a. FXXI E/Is. None.
- b. Other prerequisites. None

11. Overall risk status of

- a. Prerequisite E/Is. N/A.
- b. Other prerequisites. N/A.

12. Adverse programmatic (peacetime) risks on

- a. The "prerequisite" E/Is if this given CSS E/I is not fielded. N/A.
- b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? None.

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? Specify.  
The Multicapable Maintainer.

16. Supporting analytical studies. None

17. Changes in manpower requirements caused by fielding this given CSS E/I. None.

18. Related changes in CSS efficiency. Increase.

Soldiers will be able to perform day or night maintenance more efficiently than they do now during adverse weather conditions.

[As stated in paragraph 2 above: "...The current maintenance tent is too heavy (3294 lbs.) bulky & too time consuming to erect/strike, (4 men-5 hours); it has poor blackout capabilities; is not camouflaged and hinders inside maintenance performance. Because of size and weight, the current tent is not adaptable to future warfighting doctrine. The LME is approximately 20'w X 32'l X 13'h, uses state-of-the-art vinyl-coated polyester fabric and a lightweight aluminum frame, thus reducing overall weight (1700 lbs.). The LME is less labor intensive to erect/strike, (12 men-1 hour); has an increased work space, and cost less than the current tent."]

19. Related changes in CSS effectiveness. Increase.

The LME will provide a lighted, dry environmental work station. Therefore, it will increase maintenance productivity (effectiveness).

20. Related force structure (equipment and/or organizational) changes...

a. In equipment (other than the equipment associated with the given CSS E/I itself). None.

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. N/A.

No concept is required.

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. Yes

Approved in 1994.

b. ORD. Yes

Approved 11 Oct 96.

c. BOIP. Yes.

BOIP approved 4th quarter FY 96. BOIP/TOTAL REQUIREMENT: Initially, a one-for-one replacement of current Tent, Frame-Type, Maintenance, Medium, Light Metal (Fritsche) (LIN V48441). Estimated TOE requirement is 2849. (Force Package I-571; Force Package II-253; Force Package III-725; Force Package IV-1300).

23. CSS E/I training in TRADOC schools. Yes.

24. Examined in

- a. TF XXI AWE (Mar 97). No.
- b. TRAC's Div Design Analysis Study. No.
- c. The Nov 97 DAWE. No.

25. Tested elsewhere. Yes.

Tested at Aberdeen Proving Grounds, MD (date unknown). No hard test data available. LME prototypes are in use at the 3rd ID in Germany, and at FT Hood, TX. Also, one LME prototype is on demonstration at the Natick Lab, MA.

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. No.

LME is considered low priority. PROGRAM FUNDING: \$350K for RDTE during FY 96, \$100K for RDTE during FY97. Estimated Unit Cost \$12,500. (MDEP) RJCO.

27. Planned BOIP (connectivity between FP). Yes.

Plans call for fielding the LME as a one-for-one replacement of the current maintenance tent.

28. Technical capabilities. Proven.

The LME will be a NDI for the Army.

[SME said that he thinks (Military Judgment [no available hard data]) the LME capabilities have been proven as a result of tests and ongoing use by selected units.]

29. LIA's 15 elements of ILS assessment. Assessed.

[This study team was able to determine that OPTEC did conduct an ILS review for the LME. However, limited study time precluded any further attempts to acquire their assessment.]

30. Fielding schedule.

- a. In time for the First Digitized Div (Sep 2000). Unknown.

[SME responded "Yes-FUE was planned for 4th quarter, FY 99, but there is no money to support this fielding." Thus, this study team assigned an "Unknown."]

- b. In time for the First Digitized Corps (2006). No.

[SME responded "No."]

c. During FY 07-10. No.

31. Overall Peacetime (Programmatic) risk. Amber  
Lack of funds.

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.

33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation. N/A.

34. Wartime backup (BU) system. No BU system planned. Maintainers would then have to work outdoors.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. Medium. Maintenance will take longer to perform, thereby adversely affecting system availability rates.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. N/A.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Medium.  
Limited fielding of the LME would adversely affect the planned synergism expected from the Multicapable Maintainer operating in those units not having the LME.

[Also, units not receiving the LME would have to continue using their current maintenance tents which are less efficient/effective than the planned LME. This in turn would likely affect maintenance turn around times when compared to units using the LME.]

38. Other adverse wartime impacts (e.g., scenario dependent). None.

39. Overall wartime risk associated with employment of this CSS E/I. Green.

40. Overall risk (considering both programmatic and wartime risks). Amber.  
Lack of funds.

41. Ordinal ranking of this CSS E/I by the CSS DCDs.

42. Cardinal ranking of this CSS E/I by the CSS DCDs.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities.

44. Remarks. None.

45. Data Sources. CW5 Parker, CASCOM (DCD-Ord Dir), DSN: 687-0585. CASCOM Sep 96 CSSMMP and related May 97 updates.



1. Title: Loading Handling System- HEMTT (HEMTT-LHS)

2. Designation. FXXI CSS Initiative

a. Description: The HEMTT-LHS consists of a standard M977 or M985 HEMTT chassis equipped with a load handling system capable of loading/off-loading demountable cargo beds (flatracks) and 8X8X20 ft ISO containers/shelters. The flatracks are interchangeable with all fielded PLS flatracks.

b. Characteristics: The HEMTT-LHS has the capability of transporting an 11 ton payload on the truck mounted flatrack while towing an M1076 PLS trailer loaded with an additional 11 ton flatrack mounted load.

c. Mission: A need exists to enhance the transport of cargo and relocate unit equipment loaded on PLS flatracks within the MSB, FSB, and the Division service batteries. HEMTT-LHS will extend the supply throughput capability of PLS configured loads into the Aviation Support Platoons, the new Forward Support Companies (FSC), the Deployable Medical Shelters (DEPMEDS) medical units, and the MLRS batteries. The System can act as a bridge transporter for engineer units.

d. PROGRAM STATUS: HQ TRADOC approved the HEMTT-LHS CEP Oct 96. HEMTT-LHS already approved as the truck chassis for the U.S. Army Engineers for their Common Bridge Transporter(CBT) and the Improved Ribbon Bridge (IRB). First draft of the HEMTT-LHS Operational concept, for all classes of supply, in the maneuver battalions and the DISCOM (Heavy Divisions) is presently out for worldwide staffing; comments are due 20 Jun 97. Primary CEP site choice is Fort Carson, CO. Secondary choice is Fort Stewart, GA. CEP evaluation will occur between Jul-Sep 97. A total of four prototypes will participate in the CEP.

e. MILESTONES: CEP approved 3 Oct 96. Integrated Concept Team (ICT) meeting #3 is scheduled for 11 Jul 97. Prototype Safety Release is planned for Jun 97.

3. DTLOMS Area.

a. Primary: Materiel

b. Secondary: None.

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Modernization.

5. CSS BOS Function.

a. Primary: Distribute.

b. Secondary: None.

6. FXXI Priority. High.  
CASCOM (DCD-Trans) priority #2 out of 7 FXX items.

[Based on above SME response, this study team assigned a "High."]

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. None.

[LHS was not listed in this Plan.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed

9. The 1996 US Army Modernization Plan. Not Reviewed.

10. Prerequisite(s).

a. FXXI E/Is. None.

b. Other prerequisites. None.

11. Overall risk status of

a. Prerequisite E/Is. N/A.

b. Other prerequisites. N/A.

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. N/A.

b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function?  
Unknown.

[a. The HEMTT-LHS SME indicated that in order to realize its full synergistic potential, the effective use of the CROP as part of the BD concept requires employment of the HEMTT-LHS. "The Army has a limited number of Corps PLS trucks for distributing CL V. As we expand to distributing all other classes of supplies via flatracks (CROP), then without the HEMTT-LHS in our FSC we will not be able to move the flatracks (CROP) forward of the brigade support area (BSA). " Further, refer to the CROP CEFA. There the same SME indicated that the HEMTT-LHS "requires" the CROP. However, this study team thinks that if HEMTT-LHS procurements were stopped, that the CROP could still have a viable battlefield role. Very limited CEFA study team resources precluded expending time at this point to resolve this issue. Until the actual dependencies ("requirements") of one to the other (CROP and the HEMTT-LHS) are resolved, this study elects to assign an "Unknown."

b. This study team also notes that CASCOM elected not to identify the "Battlefield Distribution" concept as being either a FXXI initiative or enabler. Rather CASCOM senior management labeled it as a "business practice." It is quite possible that it is the BD concept (a non-FXXI enabler/initiative) that "requires" the CROP and the HEMTT-LHS in order to realize/capitalize on its maximum synergistic benefits.]

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. Unknown.

[The SME indicated that without the HEMTT-LHS, efficiencies planned for use of CROP as part of BD to move supplies forward of the BSA will not be realized. This study team agrees with this. However, refer to the discussion in paragraph 13 above. Until the dependency relationship (in the strictest sense) of CROP to HEMTT-LHS and vice versa is resolved, this study team elected to assign an "Unknown."]

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? Unknown.

[SME indicated "None." However, refer to paragraph 13 above. This study team thinks that CROP employment in the brigade as part of the BD concept would "benefit" by HEMTT-LHS fielding. Until this is resolved, this study team elects to assign an "Unknown."]

16. Supporting analytical studies. None.

The only analysis is for the PLS for distributing CL V.

17. Changes in manpower requirements caused by fielding this given CSS E/I. None.

There will be less reliance on MHE at the delivery sites. No proposal to alter any supply support activity TOE to reduce MHE or MHE operators.

18. Related changes in CSS efficiency. Increase.

LHS will decrease transshipping times at the BSA by fostering an efficient Corps/Bde CSS asset interface.

19. Related changes in CSS effectiveness. Increase.

HEMTT-LHS will act as a combat multiplier by allowing an increase in tonnage of supplies delivered over time.

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself). None.

[There will not be any need for additional equipment beyond the HEMTT-LHS itself. The SME did not indicate that these HEMTT-LHS would also require MTS and/or DVE. However, the SME indicated that (a) based on planned CEP tests there may be a requirement to field the HEMTT-LHS now, so we may need to buy new HEMTT equipped with the LHS (\$220K). Else we may plan to only retrofit existing HEMTT (\$180K), (b) for some units the LHS would be added to existing HEMTT. Initially the HEMTT in FY 2001-04 will go through an Extended Service Program (ESP). We will be retrofitting some cargo HEMTT with the LHS, and (c) currently in an AOE

support platoon we have 12 HEMTT; whereas it is planned that there will only be 7 HEMTT in each FXXI FSC.]

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Developed.

Concept has been developed, but is not yet approved. It is in world-wide staffing now. Planned target date for briefing CDR CASCOM is mid-Jul 97.

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. N/A.

No need for a HEMTT-LHS MNS.

b. ORD. No.

This is a concept. Once we complete the planned CEP and the test data are favorable, then a HEMTT JSOR will be developed.

c. BOIP. Unknown.

PLANNED BOIP REQUIREMENT: TBD; LIN #: TBD

23. CSS E/I training in TRADOC schools. No.

Not yet, too early in the development stage.

24. Examined in

a. TF XXI AWE (Mar 97). No.

b. TRAC's Div Design Analysis Study. No.

c. The Nov 97 DAWE. No.

25. Tested elsewhere. No.

No HEMTT-LHS is employed in OJE. Plans call for a CEP test at FT Carson in Jul-Aug 97, and at FT Sill or FT Stewart in Sep 97.

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. No.

CASCOM will attempt to acquire WRAP dollars to provide 20 additional HEMTT-LHS for FY 98. Concerning the ESP, the PM has in the POM \$19M for one year, \$19M for another year, and \$20M for a third year (totals \$58M). This \$58M for the ESP may/may not be enough money depending on the number of HEMTT-LHS that HQDA ODCSOPS decides to retrofit.

27. Planned BOIP (connectivity between FP). Unknown.

The proper mix of HEMTT-LHS with other equipment is TBD.

28. Technical capabilities. Unproven.

The technical capabilities include the transporting, loading and unloading of 8-11 STON flatrack payloads from the BSA to maneuver units. These capabilities will be tested during the planned Summer 97 CEP.

29. LIA's 15 elements of ILS assessment. Unknown.

[SME responded that he did not know if any ILS assessment had been conducted by LIA. He stated that the PM does this, and that the current HEMTT ILS Plan would apply to the LHS.]

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). Unknown

[SME responded "TBD." Therefore this study team assigned an "Unknown."]

b. In time for the First Digitized Corps (2006). Unknown.

c. During FY 07-10. Unknown.

31. Overall Peacetime (Programmatic) risk. Amber.

Due to lack of funds. We have enough money to ESP about 1/2 of a Heavy division now. This may equate to enough HEMTT-LHS, but HQDA ODCSOPS has not yet decided what is the correct amount for such a division.

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.

RAM for the HEMTT is proven. Threat would be the same as for any other tactical wheeled vehicle.

33. Likelihood of prerequisite C,CS or CSS E/I wartime degradation. N/A.

34. Wartime backup (BU) system. The PLS, or use of other HEMTT (without LHS) with whatever MHE is available would serve as BU systems.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. N/A.

[SME indicated that the PLS, or use of other HEMTT (without LHS) with whatever MHE is available would serve as BU systems. However, SME then indicated that if these BUs were not even available, then we would be at a "Red" status. However, this study team decided to assign a "N/A" rating here, given a perceived likelihood of there being some form of these BU systems available on the battlefield, albeit in limited quantities and with their use perhaps having to be prioritized by other commanders.]

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. Medium.

[Refer to discussion in paragraph 35 above.]

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Medium.  
Units without the HEMTT-LHS would lack the efficiency of transshipments of flatracks from the BSA forward. This could adversely affect maneuver commander's decisions.

38. Other adverse wartime impacts (e.g., scenario dependent). None.

39. Overall wartime risk associated with employment of this CSS E/I. Green.  
However, as stated above, in an AOE Division we have 12 HEMTT in a battalion support platoon. Plans call for 7 HEMTT-LHS in the new FXXI FSC in support of each maneuver battalion. If one of these becomes inoperative for any reason, risk will increase for the maneuver commander.

40. Overall risk (considering both programmatic and wartime risks). Amber.  
Amber due to lack of funds if the actual Army requirement is 486 systems. If the actual requirement is greater than 486 systems to include Corps assets, then the overall risk becomes "Red" due to an even worse funding situation.

[This study team left this overall risk rating at "Amber" rather than reducing it to "Red."]

41. Ordinal ranking of this CSS E/I by the CSS DCDs.

42. Cardinal ranking of this CSS E/I by the CSS DCDs.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities. N/A.

[N/A as the HEMTT-LHS was not addressed by this Plan.]

44. Remarks. None

45. Data Sources. MAJ Fred Wehrli, CASCOM (DCD-Trans), DSN: 687-2948.

1. Title. Maintenance and Repair Support System (MARSS).

2. Designation. FXXI CSS Initiative.

a. Description: MARSS is a prototype system that offers a revolutionary approach to human/machine interface for maintenance and logistical support. MARSS incorporates a technique for body-integral electronics packaging, which allows freedom of movement. MARSS uses an advanced low power microprocessor and intuitive software, combined with IETM's, to guide the user through maintenance tasks; using a head-mounted display with voice activated software and body vest integrated hardware package.

b. Characteristics: The hands free approach will allow maintainers to support a wider range of equipment in the most efficient manner. MARSS is designed using an open hardware/software architecture providing interoperability with diagnostics, global positioning systems, wireless communications and logistical support systems. Furthermore, MARSS is designed for peer to peer communications and communications to rear elements. MARSS is being designed using COTS hardware. MARSS has sufficient memory to operate as a platform for Mobile Support Team (MST) automation, upon release of NT SAMS software.

c. Requirements/Mission: MARSS is multifunctional; they are being tested in the medical and special operations communities. MARSS was tested in a maintenance shop environment during a BLAWE, Ft Polk, LA., May 96, Oct 96, and Dec 96 using real soldier mechanics; results from test demonstrated MARSS as a true maintenance enabler and the mechanics enjoyed using the system.

d. Milestones: Submit MARSS as a WRAP candidate, upon successful completion of ACT II demonstration.

3. DTLOMS Area.

a. Primary: Materiel.

b. Secondary: None.

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Both.

The MARSS will provide a platform to conduct MST automation, and will communicate data to rearward elements.

5. CSS BOS Function.

a. Primary: Fix.

b. Secondary: None.

6. FXXI Priority. Low.

The MARSS is in its early stages of development. Testing has not yet started, but the MARSS will use COTS technology and be a NDI for the Army.

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. None.

[MARSS was not listed in this Plan.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed.

9. The 1996 US Army Modernization Plan. Not Reviewed.

10. Prerequisite(s).

a. FXXI E/Is. None.

b. Other prerequisites. CS

MARSS will be depended on radio frequency communication links (e.g., SINGARS). However, MARSS will have its own cellular transmission "Backup" communication device for satellite transmission.

11. Overall risk status of

a. Prerequisite E/Is. N/A.

b. Other prerequisites. Unknown.

[The SME responded "Very low. But the extent of the overuse of SINGARS, EPLRS, and PLRS is To-Be-Determined." Even though this study team has no information concerning the risk status of adequate battlefield communications being available for MARSS, it is felt that the risk is "Unknown" rather than "Very low." Thus, this study team assigned an "Unknown."]

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. N/A.

b. The other prerequisites. None.

[If MARSS were not fielded, then there would simply be less of a burden on battlefield communications.]

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? None.

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.



15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? Specify.  
The Multicapable Maintainer will benefit by MARSS. So also will the ICS3 (SAMS).

16. Supporting analytical studies. None

17. Changes in manpower requirements caused by fielding this given CSS E/I. None.

18. Related changes in CSS efficiency. Increase.

Provides the mechanics with the capability to rapidly interface with on-board vehicle diagnostics and to interface in a real-time manner with maintenance STAMIS.

19. Related changes in CSS effectiveness. Increase.

Reduced time to troubleshoot and receive CL IX repair parts. This in turn will increase system operational availability rates over our present system.

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself). None.

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Not Developed.

MARSS is part of the Ordnance Vision XXI that still is under development.

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. N/A.

None needed as MARSS is low cost.

b. ORD. Unknown.

CASCOM is still researching if an ORD is needed.

c. BOIP. No.

Not yet developed. Planned basis of issue/TOTAL REQUIREMENT: One per MST.

23. CSS E/I training in TRADOC schools. No.

Not yet, too early in MARSS development cycle.

24. Examined in

a. TF XXI AWE (Mar 97). No.

b. TRAC's Div Design Analysis Study: No.

c. The Nov 97 DAWE. No.

25. Tested elsewhere. Yes.

Tested at Ft Polk in 1996. Results were favorable and further funding was acquired so MARSS could go into Advanced Concept Technology (ACT) II. Plans call for testing MARSS as part of ACT II in Feb 98 at the NTC.

[As stated in paragraph 2c above "...MARSS is multifunctional; they are being tested in the medical and special operations communities. MARSS was tested in a maintenance shop environment during a BLAWE, Ft Polk, LA May 96, Oct 96, and Dec 96 using real soldier mechanics; results from test demonstrated MARSS as a true maintenance enabler and the mechanics enjoyed using the system."]

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. No. PROGRAM FUNDING: MARSS is funded by ARPA and a FY 97 ACT II BAA.

27. Planned BOIP (connectivity between FP). Unknown.  
Too early in MARSS development cycle.

28. Technical capabilities. Proven.  
Proven in the 1996 BLAWE tests. Also, MARSS will use COTS technology which is proven in the civilian sector.

29. LIA's 15 elements of ILS assessment. Not Assessed.  
Too early in MARSS development cycle.

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). Unknown  
MARSS is still under development.

b. In time for the First Digitized Corps (2006). Unknown.

c. During FY 07-10. Unknown.

31. Overall Peacetime (Programmatic) risk. Amber  
Needs funding and more Army testing.

[Also, there is no developed operational Concept, and CASCOM is still researching if an ORD is required. This study team would have rated this "Red" except for the fact that MARSS will use proven COTS technology and was permitted to go into ACAT II.]

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.

33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation. Low.

[MARSS has no stated FXXI prerequisites. However, this study team thinks that if sufficient battlefield communications are made available to MARSS, then the wartime risk to such communications failing would be low in a conventional war.]

34. Wartime backup (BU) system. Only BU system would be to do what maintainers do today; i.e., use current manual diagnostic procedures and order CL IX through manual procedures or through STAMIS.

[This study team also thinks that other maintenance enablers/initiatives could possibly be used in a BU mode; e.g., ETM/IETM.]

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. N/A.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. Medium  
If MARSS were degraded on the battlefield, reversal to use of BU procedures would adversely affect our maintenance ability and impact the rapid fixing of inoperative equipment. This in turn would adversely affect system operational availability rates.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Medium.  
Units without the MARSS would suffer a degradation in field maintenance capability.

38. Other adverse wartime impacts (e.g., scenario dependent). None.

39. Overall wartime risk associated with employment of this CSS E/I. Green.

40. Overall risk (considering both programmatic and wartime risks). Amber.

[Refer to paragraph 31 above.]

41. Ordinal ranking of this CSS E/I by the CSS DCDs.

42. Cardinal ranking of this CSS E/I by the CSS DCDs.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities.

44. Remarks. None.

45. Data Sources. CW3 Slaughter, CASCOM (DCD-Ord Dir), DSN: 687-0595.

1. Title. Medical Communications for Combat Casualty Care (MC4)

2. Designation. FXXI CSS Initiative.

a. Description:

(1) The MC4 program provides real-time medical situation awareness and enhanced casualty care treatment to the warfighter in a distance and time independent manner. The MC4 program provides superior casualty acquisition, medical monitoring, clinical consultation, and enhances command and control throughout the battlefield to improve the quality and timeliness of health care services provided to deployed forces.

(2) The MC4 program will provide for fully integrated medical products and information and communication solutions that effectively and seamlessly link both vertically and horizontally all echelons of medical care. This linkage will include all current and future information systems and databases, communications systems, administrative procedures, medical diagnostic and monitoring systems, patient treatment systems, and evacuation platforms that span the operational continuum. The end state of this program is to provide a fully integrated information system that supports both the warfighter and the CHS system.

(3) Using state-of-the-art technology, MC4 will link the warfighter to the CHS system at all echelons providing critical and time-sensitive information that is necessary for health care planning, health care delivery, and force sustainment. This technology linkage, coupled with future operating capability (FOC), procedures, and management applications that are firmly rooted in doctrine, will expand the medical sphere of expertise throughout the CHS continuum. Developed products and system solutions must comply with and be fully integrated into the current and future communications (voice, video and data) infrastructure in order to provide both the warfighter and medical commander with the valuable real time or near real time data that feeds their information and decision making systems. Also, consideration must be given to the interservice, joint and coalition product and system integration. To accomplish this task the MC4 program should focus resources on solutions that support the approved FOC (known in previous documents as thrust areas) as outlined in TRADOC PAM 525-66, Operational Capability Requirements.

(4) The goal of MC4 is to provide state-of-the-art medical and information system products that support combat casualty care through the integration of medical information systems, C2 communications systems, patient diagnostic capabilities, treatment regimens, and evacuation platforms. In order to achieve this goal, MC4 will rely heavily upon the integration of existing and emerging digital communication and other advanced diagnostic and information technologies to create a seamless patient care system that begins with the individual soldier and continues throughout the CHS continuum. Additionally, the MC4 challenge is to provide these products in harmony with and not duplicating existing Army, joint and DOD products.

b. Characteristics: This program exploits a myriad of advanced technology medical appliques integrating modalities (combined audio, visual, and digital advanced technologies) to

seamlessly network patient care from level 1 division units to consulting facilities that are now capable of forward projecting care. The six thrusts of the MC4 program are as follows:

- \* far-forward telemedics;
- \* mobile medical mentoring vehicle;
- \* digital field medical treatment facility;
- \* expert tertiary care host;
- rapidly driven ARPA advance technology insertions; and
- \* telecommunications and operational sustainment.

c. Requirement/Need/Mission: The Army Plan calls for the use of Telemedicine to enhance the quality and timeliness of combat care services rendered to our deployed forces. The AMEDD currently does not have an effective method of linking health care providers and diagnostic systems into a seamless, diagnostic, treatment and evacuation capability. MC4 program has the potential to project increased medical expertise and capabilities forward on the battlefield to enhance survival of casualties and reduce patient evacuation from the combat zone. This increases the soldier component of the combat commander's weapon systems by keeping more soldiers with their units and fewer being evacuated. The timing of this need is based on advanced technology demonstrations and advanced warfighting experiments that show the integration of emerging information management in the mission area significantly improves combat casualty care. Failure to fund this program will deny/delay our soldiers receiving real-time access to expert medical support in a distance and time independent manner.

### 3. DTLOMS Area.

- a. Primary: Materiel.
- b. Secondary: Soldiers.

### 4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Both.

Both Digitization and Modernization. The developed products and systems solutions must comply with and be fully integrated into the current and future communication (voice, video and data) infrastructure in order to provide both the warfighter and medical commander with the valuable real time or near time data that feeds their information and decision making systems.

### 5. CSS BOS Function.

- a. Primary: Man.
- b. Secondary: None.

### 6. FXXI Priority. High.

MC4 is ranked number 2 of 13 approved Medical FOC in TRADOC Pam 525-66, dated 1 Dec 1996.

[This study team could not locate the version of this Pam dated 1 Dec 96. However, TRADOC Pam 525-66 dated 1 May 97, page 106 discusses Medical C4I. This study team could not find any reference to ratings such as "High" being assigned to each medical Future Operational Capability.]

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. None.

[MC4 was not listed in this plan.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Briefed.

[HQ TRADOC briefing charts did not recommend any additional funding for MC4. However, the charts indicated MC4 to be "Green" for money in the POM or programmed to be in the POM for the First Digitized Division by FY 2000 or before.]

9. The 1996 US Army Modernization Plan. Reviewed.

[a. Page L-9 of this Plan discussed MC4: "... C4I must provide for and manage horizontal and vertical technology insertion into all organizational designs, including MC4. This Plan rated medical C4I as Red for the entire FXXI time frame (FY 98-10). Rationale: "...rated Red in the near term (FY 96-98) because of the increased need for communications and split-base capability for CHS C2 elements. Current medical C2 organizations are redundant in terms of battlefield functions. Current staffing levels of selected medical C2 units are inadequate, although changes resulting from the medical reengineering initiative will alleviate redundancy and staffing level inadequacies. The capability is rated Red in the mid (FY 99-01) and far (FY 02-11) terms because no funds have been identified for state-of-the-art communications and information management equipment."

b. Page L-20 specifically discussed MC4 and indicated that it is a "...key unfunded medical program. Page L-21 went on to further discuss MC4 Far Forward Telemedicine, MC4 Mobile Medical Mentoring Vehicle, and MC4 Digital Field Medical Treatment Facility. This section concludes that: "... funding is not available to develop and/or test materiel-associated MC4."]

10. Prerequisite(s).

a. FXXI E/Is. CSS.

MSAC, WPSM, T-Med, DMR, FBCB2-CSS Functionality (medical call for support), and the MARC card as part of the PSSCS are all required for MC4. MC4 requires input information from each in order to realize its maximum potential. Medical information will be initiated down at the BN level (Echelon I medical care). This info must be sent to BDE, Division and Corps. As medical information moves through these levels, it must go through the MC4 system. This integration, linkage and flow of medical information from MSAC, DMR, T-Med, WPSM and other systems is "MC4."

[This study team included these initiatives as "prerequisites" since the CEFA assessments for FBCB2-CSS Functionality, MSAC and WPSM each indicated they will support MC4 in one degree or another.]

b. Other prerequisites. CS; CSS.

MSE communications and information from the Theater Army Medical Management Information System (TAMMIS) are both considered essential for MC4 to properly function.

11. Overall risk status of

a. Prerequisite E/Is.

(1) High.

[MSAC is rated by CEFA as "Red." Refer to the MSAC CEFA for rationale.]

(2) High

[WPSM is rated by CEFA as "Red." Refer to the WPSM CEFA for rationale.]

(3) Medium

[T-Med is rated by CEFA as "Amber." Refer to the T-Med CEFA for rationale.]

(4) Medium

[DMR is rated by CEFA as "Amber." Refer to the DMR CEFA for rationale.]

(5) Medium

[FBCB2-CSS Functionality is rated as "Amber." Refer to the FBCB2-CSS Functionality CEFA for rationale. Further, Medium: MARC is rated by CEFA as "Amber." Refer to the MARC review for rationale.]

b. Other prerequisites.

(1) Unknown. [An overall risk rating for the availability of sufficient MSE communications for MC4 is unknown to both the SME and this study team.]

(2) Unknown. [An overall risk rating for TAMMIS is unknown to both the SME and this study team.]

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. Medium.

For each of the listed FXXI CSS prerequisite initiatives, the absence of MC4 would not provide an efficient and automated system for integrating their individually unique medical information, thus degrading the synergistic potential for medical situational awareness.

b. The other prerequisites.

(1) None. Absence of MC4 would mean one less communication requirement for MSE.

(2) Medium. The absence of MC4 would cause a loss in the capability to provide an efficient and automated system for inputting integrated, timely and accurate medical information into TAMMIS. Thus, medical situational awareness would be degraded.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? Specify. DMR, WPSM, T-Med, and the MSAC (medical module of the CSSCS).

[Note that these are also listed as "prerequisites" for MC4. As discussed by the SME, the idea here is that these are automated systems, so inter-linked that each depends on the other for realizing the maximum synergy in medical situational awareness.]

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. Medium. If MC4 were not fielded, we would see a degradation in the overall expected synergy needed to obtain the maximum possible medical situational awareness (supplies, patient care and evacuation, etc.) from such initiatives as DMR, WPSM, T-Med and MSAC.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? Specify. The MARC card would benefit.

[a. The AMEDDC&S CEFA SME for the IM Integration initiative indicated that IM Integration would benefit by fielding MC4.

b. Also, the AMEDDC&S SME for MC4 indicated that the MARC card is a "prerequisite" for MC4, and also that the MARC card by itself as a system would realize certain benefits from implementing MC4. Thus, these systems are heavily dependent on each other for maximizing the synergistic benefits expected in medical situational awareness.]

16. Supporting analytical studies. None. No analytical studies exist.

17. Changes in manpower requirements caused by fielding this given CSS E/I. Increase. There likely may be an increase in manpower requirements as MC4 may contribute to the creation of a S-6 automation staff in the Combat Support Hospital, Medical Group and the MEDCOM. This is a working initiative at the AMEDDC&S.

18. Related changes in CSS efficiency. Increase. No empirical data to support this answer. Joint testing to be completed in Spring of 1998.

19. Related changes in CSS effectiveness. Increase. No empirical data to support this answer. Joint testing to be completed in Spring of 1998.



20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself). Increase.

Currently there is minimal voice and data communications equipment and capability in medical units. Therefore, MC4 will have to provide for a robust infrastructure to link systems at all echelons of healthcare. Units will have to transmit information from BDE to Corps. AMEDDC&S currently has Signal Center & School personnel working the issue of extra/possibly dedicated communication requirements/equipment. Also, there may an increase need for additional computer equipment to support MC4 requirements. AMEDDC&S is currently examining this issue.

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. N/A.

There is no need for an operational concept for MC4, as MC4 is covered by TRADOC Pamphlet 525-50.

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. Yes.

An Army-unique MNS will be approved in Aug 97. An approved Joint MNS for TMIP is applicable.

b. ORD. No.

No Army-unique ORD exists yet. An approved Joint ORD for TMIP is applicable.

c. BOIP. No.

[BOIP's do not currently exist. However, the following information was obtained from the AMEDDC&S's 13 May 97 input to CASCOM's CSS MMP:

"MC4 BASIS OF ISSUE/TOTAL REQUIREMENT:

\* Far-forward Telemedics thrust includes the following appliques:

\* Appliqué 1. Hands-free, two-way radio; ZLINs TBD; BOIPs TBD; Estimated TOE requirements 3346 (Force Package I 783; Force Package II 502; Force Package III 911; and Force Package IV 1150). Medics' smart pack/global positioning system and read, write medical record capability; ZLINs TBD; BOIPs TBD; Estimated TOE requirements 3346 (Force Package I 783; Force Package II 502; Force Package III 911; and Force Package IV 1150).

\* Appliqué 2. Text and facsimile data devices at the battalion aid stations; still imagery, storage, and transmitter employing SINCGARS. ZLINs TBD; BOIPs TBD; Estimated TOE requirements 697 (Force Package I 192; Force Package II 98; Force Package III 180; and Force Package IV 227).

\* Mobile Medical Mentoring Vehicles (M3V) thrust; one per Division (at Corps) determined by Mission, Enemy, Terrain, Troops and Time Available (METT-T); Medical Group, and

Medical Brigade; new start ZLIN TBD; BOIP TBD; Estimated TOE requirements 31 (Force Package I 9; Force Package II 6; Force Package III 5; and Force Package IV 11). Digital Field Medical Treatment Facility thrust include the following appliques:

\* Appliqué 1. Wireless medical communications, multi-modality transmitter/receiver for treatment, digital acquisition system, medical image and data LAN, full motion video transmitter/receiver; one per Forward Support Medical Company, Main Support Medical Company and Area Support Medical Company; new start ZLIN TBD; BOIP TBD; Estimated TOE requirements 200 (Force Package I 49; Force Package II 32; Force Package III 54; and Force Package IV 65.)

\* Appliqué 2. Same as Appliqué 1, but a robust package; one per Combat Support Hospital; new start ZLIN TBD; BOIP TBD; Estimated TOE requirements (includes Additives) 42 (Force Package I 12; Force Package II 1; Force Package III 10; and Force Package IV 19.)

\* Appliqué 3. Wireless medical logistics communications, one per Medical Logistics Battalion and Theater Medical Materiel Management Center new start ZLIN TBD; BOIP TBD; Estimated TOE requirements 10 (Force Package I 3; Force Package II 5; Force Package III 1; and Force Package IV 1.)

\* Appliqué 4: Medical Command Decision Support System; one per Medical Command & Control HQs new start ZLIN TBD; BOIP TBD; Estimated TOE requirements 13 (Force Package I 5; Force Package II 3; Force Package III 3; and Force Package IV 2.)

\* Expert Tertiary Care Host Thrust provides for full motion video telemedicine capability that enables the expert within the CONUS Medical Center to project expertise forward to the battlefield. one per designated Medical Centers; new start TDA requirement; Estimated TDA requirement 4 (Force Package I 2; Force Package II 2; Force Package III 0; and Force Package IV 0.)

\* Rapidly Driven ARPA Technology Insertions Thrust provides resources for proof of principle and development proveout of rapidly driven ARPA medical technology developments for their biomedical telemedicine technology base program. Basis of Issue is predicated on technology fielded.

\* Telecommunications and Sustainment Thrust provides for telecommunications support and sustainment including Inmarsat, Milsta, and commercial satellite interfaces. Basis of Issue is non-applicable."]

23. CSS E/I training in TRADOC schools. Yes.  
Elements of MC4 are being taught in selected TRADOC schools.

24. Examined in

a. TF XXI AWE (Mar 97). Yes.  
Army Medical Department Test Board, in conjunction with OPTEC, tested MC4 components at the NTC. OPTEC's report is not yet available (as of the date of AMEDDC&S' submission of this assessment.)

[CASCOM 23 Apr 97 briefing charts presented by CDR CASCOM to the C&GSC indicated that Teleconsultation and Telementoring were reviewed at the TF XXI. These charts, however, did not

provide for any assessment of these items. TRAC-LEE May 97 briefing charts for "Emerging Results" of the CSS Analysis indicated that: "...Medical Initiatives. Indications based on the SME are that these (MC4, Medical Digital Assistant, Teleconsultation, Telementoring, and the ATTV) saw little use during the AWE...analysis continuing." CASCOM 9 Jun 97 briefing charts for BG Dayan (Israeli Army) indicate that MC4 was a TF XXI initiative, and "... AWE Insights: Teleconsultation received limited use, but when used, the links were successful. Telementoring most useful in light infantry. NTC is not the environment to test medical systems which require the stress of wounding.

b. TRAC's Div Design Analysis Study: No.

c. The Nov 97 DAWE. Unknown.

25. Tested elsewhere. Yes.

(a) PRIMETIME III (Bosnia-ongoing), (b) PACMED NET (Hawaii-ongoing), (c) COBRA GOLD (Joint exercise in the Pacific, 1996 and 1997), (d) Joint Warfighter Information Demonstration (1996- Ft Bragg and Ft Gordon).

[SME indicated that he was not sure as the extent that the above were more "demonstrations" than they were actual "tests."]

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. Yes  
\$10M has been designated for MC4 for FY 99, but only for selected units only in FP1.

[Source: 13 May 97 input to CASCOM's draft CSSMMP:

PROGRAM FUNDING: MDEP RJM1 (OPA), RJM1(OMA), and RJM2 (RDTE) Standard Study Numbers (SSNs) RJM1 (OPA) MN1070, RJM1(OMA) Program Elements (PEs) 112017, and RJM2 (RDTE) PEs 64807 D836 & 65807 D832. Estimated unit cost (current dollars) varies by item considered:

\* Per Combat Medic: Hands-Free Two-way radio (includes voice/data) (OMA) - \$2,750;

\* Per Combat Medic: Medic's Smart Pack (OMA) - \$500;

\* Per BAS Text and Fax devices (OPA) - \$50K;

\* Per Medical Company (FSMC, MSMC, & ASMC) wireless medical communication, multi-modality transmitter/receiver for treatment, digital acquisition system, medical image and data LAN, full motion video transmitter/receiver (OPA) - \$650K;

\* Per Division (at Corps), Medical Group, and Medical Brigade Mobile Medical Mentoring Vehicles (M3V) (OPA) - \$1.5 to 2.0M;

\* Per Combat Support Hospital (CSH) wireless medical communication, multi-modality transmitter/receiver for treatment, digital acquisition system, medical image and data LAN, full motion video transmitter/receiver (robust package) (OPA) - \$4.0M;

\* Per Medical Logistics Battalion wireless medical communications (OPA) - \$185K;

\* Per Medical Command & Control HQs Medical Command Decision Support System (OPA) - \$500K; and

\* Per CONUS Hospital Development (Health Affairs Appropriation 21) - \$5M

27. Planned BOIP (connectivity between FP). Unknown.

28. Technical capabilities. Unproven.

Some items of MC4 sub-components may have been proved in the civilian sector. But, their use in a simulated wartime environment is unproven to date.

29. LIA's 15 elements of ILS assessment. Unknown.

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). Unknown.

b. In time for the First Digitized Corps (2006). Unknown.

c. During FY 07-10. Unknown.

31. Overall Peacetime (Programmatic) risk. Red.

[a. SME responded "Amber. MC4 not fully tested. Even though MC4 now has a PM, the program has not yet reached MS 0. MC4 may need more funding. Status of adequate communications is unresolved." However, the SME indicated this rating of "Amber" without knowledge of the risks associated with the declared MC4 prerequisites. Given the CEFA risks for the MC4 prerequisites (refer to paragraph 11 above), so much of the desired synergy is at some risk: MSAC is "High;" WPSM is "High;" FBCB2-CSS Functionality is "Medium;" T-MED is "Medium;" and MARC is "Medium."

b. Also, the SME indicated in paragraph 17 above that "Increase. There likely may be an increase in manpower requirements as MC4 may contribute to the creation of an S-6 automation staff in the Combat Support Hospital, Medical Group and the MEDCOM. This is a working initiative at the AMEDDC&S."

c. Given the above, this study team subjectively assigned an overall MC4 risk rating of "Red." Furthermore, it is felt that a "Red" rating is appropriate even without considering the risk status of the prerequisites.]

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.

33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation. Low.

[a. SME responded "Low. There are few automated systems in the Theater which will cause continued loss of medical information."

b. Also, CEFA assessments for each of the prerequisites indicate a "Low" likelihood for their individual wartime degradation. This study team has no information as to the likelihood of wartime degradation to battlefield communications.

c. Given the above, this study team agreed with the AMEDDC&S SME on the "Low" rating here.]

34. Wartime backup (BU) system. Any BU system would largely depend on stubby pencil. There is only one TAMMIS in the Division now.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. N/A.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available.  
Medium.

Loss of system (MC4) connectivity and medical situational awareness would suffer.

Manpower intensive efforts that would not be timely and possibly be inaccurate would be required to share or process C2 and medical intelligence information.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Medium.

Units not receiving MC4 would have to resort to manual entry of medically related information, and would suffer a loss in medical C2 and situational awareness.

38. Other adverse wartime impacts (e.g., scenario dependent). None.

39. Overall wartime risk associated with employment of this CSS E/I. Amber.

Once MC4 is fielded, there are no plans for fielding any redundant wartime BU systems.

Therefore, there will always be an associated wartime risk relating to patient care and evacuation.

40. Overall risk (considering both programmatic and wartime risks). Red

[SME responded "Amber. Not fully tested yet; may need more money; status of adequate communications is unresolved; not yet even gone through MS 0; no plans to field any modern/efficient wartime BU systems." However, for reasons cited in paragraph 31 above this study team elected to assign a "Red."]

41. Ordinal ranking of this CSS E/I by the CSS DCD.

42. Cardinal ranking of this CSS E/I by the CSS DCS.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities. N/A.

[MC4 was not listed in this plan.]

44. Remarks. None

45. Data Sources. MAJ Sadler and MAJ Windham, AMEDDC&S, DSN: 471-2433.

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1. Title. Medical Logistics- Division (MEDLOG-D)- Theater Army Medical Management Information System (TAMMIS)

2. Designation. FXXI CSS Enabler.

As a result of new doctrine associated with Force XXI and the Battlefield Distribution concept, study team sized stockage lists for all classes of supply are being removed from the Division rear. One issue being tested during the DAWE is whether throughput distribution in concert with an enabling technology (TAMMIS MEDLOG-D) can adequately compensate for the removal of the Division's Class VIII sustainment stocks.

a. Class VIII inventory and assemblage management at Combat Health Support Levels I & II is currently a manual process. An automated capability for Division level was identified in the original TAMMIS Mission Need Statement, subsequently approved by the DOD Major Automated Information Systems Review Council, but never developed. This information system deficiency is currently being addressed through the development of a prototype software system called TAMMIS MEDLOG-D.

b. MEDLOG-D automates the functions of both inventory and assemblage management for division level medical units during peacetime and war. It provides a standard information system to facilitate product identification, order generation, order tracking and status posting, demand history, quality control, expenditure tracking, and assemblage management.

c. MEDLOG-D is designed with MILSTRIP interfaces to enable it to pass data to any logistics system capable of accepting electronic/magnetic MILSTRIP transactions. This includes, TAMMIS MEDSUP and the Defense Medical Logistics Standard Support (DMLSS) System (when completed). Catalog data can be accessed from both the supporting unit's Authorized Stockage List (ASL) and the Universal Data Repository (UDR) Compact Disks. The templates for all medical assemblages will be provided in electronic form by the U.S. Army Medical Materiel Agency.

d. Elimination of the Division's Class VIII sustainment stocks will require comprehensive planning by the Division Surgeon Section (DSS) and increase reliance on throughput distribution from the supporting Corps MEDLOG units. With a basic load of only 3-5 days of supply (DOS) in Division level medical assemblages, it becomes imperative that a Corps MEDLOG unit is sequenced early (no later than C+5) on the Time Phased Forces Deployment List. Until the Corps MEDLOG unit is in place and line item requisitioning is established, Division medical units will require preconfigured resupply (PUSH) packages every 48-72 hours from CONUS.

e. Given the availability of assured communications within division level medical units, Class VIII inventories can be maintained and requisitions can be electronically transmitted to the Corps medical logistics unit. Under the Medical Reengineering Initiative (MRI), each Medical Logistics Battalion (MEDLOG BN) assigns one Medical Logistics Company (MEDLOG CO) in direct support of each division. Once established, the MEDLOG CO provides Class VIII resupply support to all divisional medical elements and those Corps medical elements operating in the division. The newly established Support Operations Section of the MRI MEDLOG BN will be responsible for coordinating transportation requirements with the Corps Distribution Manager. The

primary means of distributing routine Class VIII supplies from the Corps to the Division Support Area (DSA) and BSA will be via Corps level transportation units. Both ground and air ambulances will still be employed for emergency resupply.

f. In the absence of the DMSO, the Class VIII management function in the Division will transfer to the Medical Materiel Management Branch (MMMB) at the DISCOM's Division Materiel Management Center with oversight provided by the Medical Logistics Planner at the DSS. The MMMB will maintain a record of all open Class VIII requests using MEDLOG-D and coordinate with the Division Support Operations staff and Corps MEDLOG BN for throughput distribution to the BSA. Shipment of Class VIII from the BSA to the FSC medical platoons will be coordinated with the FSB Support Operations Section. The MMMB will also provide situational awareness of Class VIII to the Medical Logistics Planner at the DSS.

[As briefed by CASCOM to CDR TRADOC on 3 Apr 97, this will decrease manpower requirements up to nine personnel in a Heavy Division.]

### 3. DTLOMS Area.

#### a. Primary: Materiel.

MEDLOG-D will provide a standard methodology and automation support to facilitate product identification, order generation, order tracking and status posting, consumption history, expenditure tracking, and assemblage management. MEDLOG-D is designed to enhance management and efficiency of CL VIII materiel support within Combat Health Support level I and II organizations. MEDLOG-D is intended for use in both peacetime and war.

#### b. Secondary: Soldiers.

### 4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Both

### 5. CSS BOS Function.

#### a. Primary: Man.

#### b. Secondary: None.

### 6. FXXI Priority. Medium.

Ranked # 8 of 13 approved Medical FOC in TRADOC Pam 525-66, dated 1 Dec 96.

[This study team could not locate aforementioned Pamphlet. Rather, I found TRADOC PAM 525-66, dated 1 May 97. In this PAM, I could not locate any direct reference to MEDLOG-D; however, MD 97-008, page 108, paragraph Combat Health Logistics System (CHLS) and Blood Management describes management of Division-level CL VIII. Also, this study team could not locate any reference in the PAM that such items are listed in any priority sequence.]



7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. None.

[MEDLOG-D was not in this plan- too early in its conceptual stages.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed.

9. The 1996 US Army Modernization Plan. Reviewed.

[MEDLOG-D is not specifically mentioned. However, the issue of CHLS and Blood Management is discussed on page L-11. Such is rated "Amber" across the FXXI years (FY 98-10) because "...resourcing remains unresolved...the lack of total asset visibility and in-transit visibility continues to hamper the ability of the Combat Health Logistics System to efficiently distribute medical logistics support on the battlefield."]

10. Prerequisite(s).

a. FXXI E/Is. None.

b. Other prerequisites. CS.

MEDLOG-D requires a connection to the MSE Small Extension Node. The existing system is TAMMIS-MEDSUP (Medical Supply). It is composed of an automated link from the Corps MEDLOG BN down to the DMSO, and is a paper system, below the DMSO to the Division Med Co's. This initiative will delete the DMSO and automate the linkage directly between the Corps MEDLOG BN and the Division Med Co. Thus, we now will need MSE linkages from the Corps MEDLOG BN to the Division Med Co. The limiting factor will be the availability of MSE which shall be the primary communications pipeline for the transfer of digital information.

11. Overall risk status of

a. Prerequisite E/Is. N/A.

b. Other prerequisites. Unknown.

[SME indicated that he did not know what the risk status of MSE is, but he felt that it would be "Low," and suggested coordination with the Signal Center. However, limited CEFA study resources precluded such coordination.]

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. N/A.

b. The other prerequisites. None.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? None.

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? Specify.  
CSSCS. MEDLOG-D will feed information to TAMMIS-MEDSUP, which will be linked to TAMMIS, which will feed information to CSSCS.

16. Supporting analytical studies. None.

17. Changes in manpower requirements caused by fielding this given CSS E/I. Decrease.  
If the MEDLOG-D is successful during the Nov 97 DAWE, then the nine personnel currently in the DMSO could be removed from or redistributed within the Division. Additionally, there would be significant manpower savings (sic) because the paper reorder process expends a great deal of time and energy.

18. Related changes in CSS efficiency. Increase.

MEDLOG-D will provide the following benefits to the Area Support Medical Company and the Forward Support Medical Companies in the Division:

- a. An automated mechanism to identify and order medical products.
- b. Utilization of supporting medical supply system catalog information and the UDR catalog information on CD ROM.
- c. An automated method of managing user stockage levels using actual consumption history.
- d. A standardized interface for orders from CHS level I and II users to supporting medical supply activities. This will include TAMMIS-MEDSUP, SARSS, other Army CSS automated systems and DMLSS systems in the future.
- e. An automated method for managing medical equipment sets at the CHS level I and II to identify shortages or excess and to quickly assess the readiness status.
- f. An automated order tracking, status posting and receiving process.
- g. A link between the order and receiving process for rapid receipt of materiel.
- h. An automated mechanism to track and manage fund expenditures.
- i. Quality control management of pharmaceutical products.

19. Related changes in CSS effectiveness. Increase.

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself). Increase.

Currently there are no computers in the FSMC or in the ASMC to support this new software (MEDLOG-D). The requirements would be one for each ASMC and one for each FSMC (3-4 in each Division).

[This study team was also advised that existing TAMMIS MEDSUP software has recently been upgraded and made to work on laptops. This study team does not know if such laptops currently exist in these units.]

b. In organization(s). Decrease.

If this concept is successful during the DAWE, then the DMSO can be eliminated.

21. Status of CSS E/I Operational Concept. N/A.

The system is covered by TRADOC Pam 525-50. There is no detailed operational concept for MEDLOG-D.

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. Yes.

The approved MNS for TAMMIS is being used to support the development of this prototype automation system.

b. ORD. Unknown.

c. BOIP. Yes.

Not yet developed.

23. CSS E/I training in TRADOC schools. No.

It is still an unapproved concept.

24. Examined in

a. TF XXI AWE (Mar 97). No.

b. TRAC's Div Design Analysis Study. No.

c. The Nov 97 DAWE. Yes.

MEDLOG-D will be tested during the DAWE using an IBM Powerbook 760-ED hardware platform. MEDLOG-D's environmental parameter files can be formatted to transmit or receive data via any means available to the using unit. This includes disk, modem, tactical radio, satellite, or local area networks. Communications equipment such as radio gateways, satellite ground stations, MSE access equipment, and other associated hardware and software is not organic to the MEDLOG-D system.

25. Tested elsewhere. Yes.

Development of the MEDLOG-D software and the Computer Based Training package was completed on 31 Mar 97. Three hardware platforms were issued to the Exercise Control Group Property Book Section at Ft Hood for training and testing purposes.

a. The Simulation Exercise (SIMEX) was conducted 5-10 June but consisted primarily of a Technical System Functions Check for MEDLOG-D and CSSTSS training for the medical units involved. NET on the prototype was conducted 9-20 June. The DAWE RAMP-UP is scheduled 14-23 Sep with the actual DAWE to be conducted 5-13 Nov 97.

b. The 3-67 AR has been selected to provide the FSC Medical Platoon, while the 204th FSB will provide the FSMC during the DAWE. The 4th ID DMOC will play the MMMB and the

147th MEDLOG BN will represent the Corps Class VIII Supply Activity, providing a TAMMIS MEDSUP interface for MEDLOG-D.

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. No.

There is no funding for further software development for MEDLOG-D. Additionally there is no funding to purchase the computers for MEDLOG-D. MEDLOG-D is designed to operate on any notebook, laptop, or desktop PC capable of running Windows 3.1 or Windows for Work Groups 3.11, with at least an 800 Megabytes (MB) hard drive with 50 MB available.

27. Planned BOIP (connectivity between FP). Unknown.  
BOIP not yet determined.

28. Technical capabilities. Proven.

The technical capabilities of this software are actually proven since we have an existing basecase with TAMMIS-MEDSUP that has been operating successfully for some period. However, MEDLOG-D is still considered a prototype since it has not yet been successfully tested in the field and is not being trained in the AMEDDC&S.

29. LIA's 15 elements of ILS assessment. N/A.

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). Unknown.

This is a prototype system which is to have its functionality proven during the DAWE. If its value is supported, then fielding could occur as early as FY 99.

b. In time for the First Digitized Corps (2006). unknown.

c. During FY 07-10. Unknown.

31. Overall Peacetime (Programmatic) risk. Amber.

This is to be a very low cost item. However, it is not fully tested, and the risk associated with development of adequate MSE is yet to be determined.

[This study team would have rated this as "Red" except for the fact that (a) this will be a low cost item, (b) the MEDLOG-D software and computer-based training package were completed 31 Mar 97, and (c) some training has been successfully completed.]

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.

33. Likelihood of prerequisite C,CS or CSS E/I wartime degradation. Unknown.

[SME indicated "Low." However, as stated in paragraph 10b above, "...This initiative will delete the DMSO and automate the linkage directly between the Corps MEDLOG BN and the Division

Med Co. Thus, we now will need MSE linkages from the Corps MEDLOG BN to the Division Med Co. The limiting factor will be the availability of MSE which shall be the primary communications pipeline for the transfer of digital information." Given this study team had no information about the likelihood of wartime availability to MEDLOG-D of necessary battlefield communications, an "Unknown" was assigned here.]

34. Wartime backup (BU) system. If the MSE net goes out degrading the planned automated linkage between the Division Med Co's and the Corps MEDLOG BN, then we still would have laptops at the Div Med Co's where we could update floppy disks and employ sneaker nets (hand carry computer disks back to the Corps MEDLOG BN). Ultimate BU system would be reversal to a manual system.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. N/A.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. Medium.

Timeliness and accuracy of medical supply info would be adversely affected. Medical supply reorder process will slow from an automated system to a manual, manpower intensive process.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Medium. Unfielded units would have to use a manual system to reorder medical supplies. This will also require the Corps MEDLOG BN to operate two systems, one automated and one manual.

38. Other adverse wartime impacts (e.g., scenario dependent). None.

39. Overall wartime risk associated with employment of this CSS E/I. Amber. The BU system should be more robust. This concept has not yet been tested in an operational (wartime) setting; this is to occur at the DAWE. Lastly, the availability of MSE to MEDLOG-D in wartime is "Unknown."

40. Overall risk (considering both programmatic and wartime risks). Amber.

[Peacetime risk: refer to paragraph 31 above. Wartime risk: the lack of a robust wartime BU system, and the fact that MSE wartime availability to MEDLOG-D is "Unknown."]

41. Ordinal ranking of this CSS E/I by the CSS DCDs.

42. Cardinal ranking of this CSS E/I by the CSS DCSs.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities. N/A.

[MEDLOG-D was not listed in this plan ]

44. Remarks. None.

45. Data Sources. AMMEDC&S SMEs included MAJ Philip Sadler, LTC Deffer, LTC Habib, and LTC Hutton, DSN: 471-1630.

1. Title. Medical Situational Awareness & Control (MSAC).

2. Designation. FXXI CSS Initiative.

In FY 98 MSAC is planned to become the medical module for the CSSCS, and is under the MC4 umbrella FXXI Initiative. MSAC is a command and control system that provides operational and functional situational awareness and interfaces/interacts with Army and Joint systems (both C2 and Medical). MSAC will use the latest technologies for communications and linkage to fully support the Army's CHS requirements across the health care continuum.

3. DTLOMS Area.

a. Primary: Materiel.

b. Secondary: Soldier.

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Digitization.

5. CSS BOS Function.

a. Primary: Man.

b. Secondary: None.

6. FXXI Priority. Unknown.

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. None.

[MSAC was not listed in this plan.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed.

9. The 1996 US Army Modernization Plan. Not Reviewed.

[MSAC was "indirectly" reviewed. AMEDDC&S SME reported that MSAC is a subcomponent of the MC4 system. Page L-9 of Annex L, Combat Health Support indicated that: "...C4I (Command, Control Communications, Computers, and Intelligence) must provide for and manage horizontal and vertical technology insertion into all organizational designs, including MC4." This plan rated medical C4I as Red for the near-term (FY 96-98) because of the increased need for communications and split-base operations for Combat Health Support command and control elements. The Plan related medical C4I as Red for FY 99-11 primarily due to the lack of identified funds.]

10. Prerequisite(s).

a. FXXI E/Is. CSS.

FBCB2-CSS Functionality and CSSCS. MSAC must be linked to the medical logistics system and be able to retrieve information from various medically-related data bases (e.g., FBCB2-CSS Functionality). Also, MSAC requires the CSSCS, as CSSCS is the host system on which the MSAC software will be resident/operated.

b. Other prerequisites. CSS.

MSAC requires access to the information stored in the TAMMIS, and also requires MSE linkages.

11. Overall risk status of

a. Prerequisite E/Is.

(1) Medium

[FBCB2-CSS Functionality is rated "Amber" by CEFA.]

(2) Low

[CSSCS is rated "Green" by CEFA.]

b. Other prerequisites. Unknown.

Availability of MSE is unknown by the SME. Also, SME estimated that TAMMIS is Green (since it has been proved in Operation Desert Storm).

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. None.

b. The other prerequisites. None.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function?  
None.

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? Specify.  
CSSCS and MC4. Other sub-modules of the CSSCS as a "system" would benefit by the operation of the planned MSAC.

[MC4 needs the MSAC in order to realize its (MC4) maximum synergistic benefits derived from the collection of patient information from many different sources. MSAC is just one of several (e.g., Telemedicine, MEDLOG-D, TMIP, WPSM) medical initiatives that input to the MC4 initiative. Without MSAC the efficiency/effectiveness of MC4 would be degraded. Manual



(Combat Medic/Combat Lifesaver) and time consuming methods would have to be used to capture the data which otherwise would be provided by the MSAC.

16. Supporting analytical studies. None.

No analytical studies exist.

17. Changes in manpower requirements caused by fielding this given CSS E/I. None.

18. Related changes in CSS efficiency. Increase.

Increases in information accuracy and timeliness are expected. However, no empirical data to support this.

19. Related changes in CSS effectiveness. Increase.

MSAC will provide the commander with an increased medical situational awareness, thereby allowing for a more effective system for monitoring medical supply requests, patient status, casualty information, etc. However, no empirical data to support this.

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself). None.

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Not Developed.

An MSAC-unique operational concept has not yet been developed.

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. Yes.

MSAC is covered by the approved (Oct 91) CSSCS MNS which discusses a generalized need for medical C2 information. An MC4 MNS which describes MSAC-related requirements in more detail is expected to be approved in Aug 97.

b. ORD. Yes.

MSAC is covered by the CSSCS approved (Oct 94) ORD.

c. BOIP. Yes.

MSAC is covered by the approved (Aug 94) BOIP for CSSCS.

23. CSS E/I training in TRADOC schools. No.

Not yet.

24. Examined in

a. TF XXI AWE (Mar 97). No.

b. TRAC's Div Design Analysis Study. No.

c. The Nov 97 DAWE. No.

[This study team knows that MEDLOG-D is the only "medical" initiative to be assessed by TRAC in the upcoming DAWE.]

25. Tested elsewhere. No.

MSAC is not yet fielded as part of the CSSCS. Only a prototype MSAC system exists.

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. No.

[SME specifically reported that MSAC was not funded in the POM. However, since MSAC is a component of the MC4 and planned to become in FY 98 the medical module for CSSCS, this study team thinks that MSAC may be partially funded in FY 99 with the \$10M planned for MC4.]

27. Planned BOIP (connectivity between FP). Yes.

Since MSAC is to be a software system resident on the CSSCS hardware, the CSSCS BOIP applies.

[As cited in the CEFA for the CSSCS BOIOP: "...There will be connectivity between all four FPs. Per the CSSCS CEFA SME: (a) there is an Oct 94 approved BOIP of 19 CSSCS per Div for all 10 Divisions, (b) plans call for fielding CSSCS also to the 15 Enhanced Readiness BDEs, and (c) when CSSCS is fielded to a parent active duty unit, at that time CSSCS will also then be fielded to aligned USAR/NG units. ]

28. Technical capabilities. Unproven.

As it relates to the MSAC system/software.

29. LIA's 15 elements of ILS assessment. Not Assessed.

MSAC exists only in a prototype stage.

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). Unknown.

b. In time for the First Digitized Corps (2006). Unknown.

c. During FY 07-10. Unknown.

31. Overall Peacetime (Programmatic) risk. Red.

[SME responded "Amber. Lack of funds and testing." However, this study team thinks that a "Red" is more appropriate. It is unclear how much money is programmed for MC4. Also, there is no MSAC-unique operational concept, and MSAC technical capabilities are unproven.]

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.

Since MSAC is to be a software system resident on the CSSCS hardware, the CSSCS threat, etc. applies. The CSSCS CEFA assessed this likelihood as "Low."

33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation. Medium

[a. CEFA assessment for the FBCB2-CSS Functionality assigned a "High." CEFA assessment for CSSCS assigned a "Low" likelihood. TAMMIS: SME assessed its likelihood for wartime degradation as "Low." MSE: SME indicated that such likelihood would be "Low." Based on this information, this study team assigned a "Medium."

b. Also, concerning the fact that MSAC requires (1) access to the information stored in the TAMMIS, and (2) MSE linkages (refer to paragraph 10b above), this study team has no information about their likelihood of wartime degradation.

c. Based on the above, this study team assigned a "Medium."]

34. Wartime backup (BU) system. The MSAC BU system would have to be a reversal to a manual collection of data by the Combat Medic and Combat Lifesaver, and other time consuming "stubby pencil" procedures (telephone calls, faxes, people manually compiling lots of data, etc.-as we do now without the MSAC system). Such is manpower intensive, time consuming and oftentimes generates inaccurate data.)

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. N/A.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. Medium.

C2 and Intelligence aspects of this MSAC initiative would slow from the automated system when going to a manual BU system. Manpower intensive efforts would be required to share or process information that would not be timely or possibly accurate.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Medium.

Units not receiving MSAC would adversely be impacted by not having current medical C2 and intelligence, causing the need for manual entry of information and the possible loss of situational awareness or control. These units would not enjoy "Information Dominance."

38. Other adverse wartime impacts (e.g., scenario dependent). None.

39. Overall wartime risk associated with employment of this CSS E/I. Amber

[a. SME responded "Green. Since MSAC is to be a software system resident on the CSSCS hardware, the CSSCS overall wartime risk applies." The CSSCS CEFA assessed this risk as "Green."

b. However, given the above information discussed in paragraphs 33-37 above, this study team felt that an "Amber" was more appropriate as it relates to "medical" situational awareness.]

40. Overall risk (considering both programmatic and wartime risks). Red.

[Lack of funds and testing for MSAC, as well as an estimated "Medium" wartime risk in not being able to fully realize complete medical situational awareness.]

41. Ordinal ranking of this CSS E/I by the CSS DCDs.

42. Cardinal ranking of this CSS E/I by the CSS DCSs.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities. N/A.

44. Remarks. None

45. Data Sources. MAJ Haley Windham, AMEDDC&S, DSN: 4761-2433

1. Title. Modular Ammunition Company (Mod Ammo Co)

2. Designation. FXXI CSS Enabler.

One new Mod Ammo Co will result in reductions in manpower force structure requirements as compared to one AOE Ammunition Co. It will reduce requirements about 139 spaces per Co. However, the TAA-05 process may require more Mod Ammo Co's than the number of AOE Ammo Co required by TAA-03, thus resulting in an overall increase in manpower requirements.

Subject: Fact Sheet- Reorganization Proposal for Ammunition Units

a. Issue:

Current ammunition doctrine and force structures are designed to support a forward deployed force operating from a mature theater. Although the Army will continue to have some limited forward presence in selected foreign countries, in most cases it will operate from a CONUS-based force projection Army. The military must have the ability to project ammunition logistics sustainment capabilities anywhere it is directed in timely support of the operational plan. The new modular ammunition force structure will meet these requirements and will replace existing ammunition structure.

b. Concept:

(1) The primary purpose of ammunition modular support is to optimize the employment of the proper capabilities and use of resources. The company will accomplish the mission of supporting a force projection Army when properly deployed with, or before the supported force, e.g. heavy lift platoon must arrive in theater prior to the first pre-positioned ammunition ship to insure effective receipt and storage of ISO containers and /or break bulk ammunition.

(2) The ammunition company headquarters will have the capability to command and control multiple geographically separated platoons as METT-T requires and must be co-located with at least one of the platoons. This headquarters will have the capability to consolidate platoons as required in the echelons above corps area and to accomplish support in the corps and division areas.

(3) The heavy lift platoon will have the capability, with its organic rough terrain container cranes(RTCC), to load or off load ISO containers from inbound or outbound transportation assets. This platoon will have the variable reach rough terrain forklift to stuff and unstuff containers and be capable of making mission configured loads. It will also have PLS vehicles to unstuff CROP pallets from containers, move stocks in storage area, rewarehouse, and move mission configured loads to holding area. These platoons will normally be located in the TSA or CSA.

(4) The medium lift platoon does not have the RTCC. This platoon will have the variable reach rough terrain forklift to mission configure loads of ammunition from break bulk on to flatracks for using units. It is designed for the receipt, storage, stock management, inventory

control, mission configuring and issuing on an area bases. This platoon will have the PLS trucks to move ammunition within the ASP.

(5) Each of these platoons will have SAAS-4 capability with the requirement to upgrade to SAAS-MOD when fielded and will require C4 capability to communicate with the appropriate agencies. These platoons will be equipped with DOD/DA standard automated identification technology (AIT), RF tag and laser devices such as microchip technology for logistics application (MITLA) or 2D symbology. These platoons are 100% mobile.

(6) Force Structure:

(a) The company headquarters has 2 officers, 1 WO 34 enlisted: total 37

(b) Heavy lift platoon 1 officer, 1 WO, 49 enlist: total 51

(c) Medium lift platoon has 1 officer, 1 WO, 44 enlist: total 46

(7) Equipment: There is no change in type of equipment.

c. Proposal was briefed to LTG Miller, TRADOC DCD, 25 Feb 97. LTG Miller approved with comments. Based on LTG Miller comments the Common #1 tool set and the majority of the mechanics were placed into the company headquarters. Reworked proposal slides were sent to LTG Miller on 1 Apr 97, and with his approval it is anticipated that staff briefing for HQDA will occur in the April timeframe.

3. DTLOMS Area.

a. Primary: Organization

b. Secondary: Doctrine, Materiel, Leader Development, Soldiers, Training.

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Both

5. CSS BOS Function.

a. Primary: Arm

b. Secondary: None.

6. FXXI Priority. Unknown

[Unknown by the CASCOM SME.]

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. N/A.

[This plan pertains to CSS materiel issues.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed.

9. The 1996 US Army Modernization Plan. Not Reviewed.

[The Army Mod Plan primarily deals with equipment modernization. Consequently, the Mod Ammo Co was not mentioned in this plan.]

10. Prerequisite(s).

a. FXXI E/Is. None.

b. Other prerequisites. None.

11. Overall risk status of

a. Prerequisite E/Is. N/A.

b. Other prerequisites. N/A.

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. N/A.

b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? None.

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? None. However, the Mod Ammo Co will increase the efficiency of CL V distribution on the battlefield and in Split Based Operations.

16. Supporting analytical studies. Yes.

CASCOM conducted in 1996 a cost analysis comparing an AOE Ammo Co to the new Mod Ammo Co. Also, this new concept was approved by the (a) Force Design Directorate, CAC, Ft Leavenworth approved in Feb 97, and (b) Dep CDR TRADOC in May 97. The concept has now gone forward to HQDA ODCSOPS for review/approval.

[However, this study team was informed that the reductions in manpower requirements attributed to the proposed Mod Ammo Co were converted to dollar "savings", and then applied to reducing the actual cost of this new concept. This analyst has not reviewed the actual cost analysis, but former TRADOC analytic costing practices used to preclude taking credit for dollar "savings" for possible reductions in manpower requirements- UNLESS such spaces are in fact eliminated from DOD. Otherwise, the dollar "savings" might not be true "savings, as the freed-up manpower requirements

often went elsewhere within DOD against other weapon system programs, with the manpower still costing DOD the same amount of money.].

17. Changes in manpower requirements caused by fielding this given CSS E/I. Decrease. One new Mod Ammo Co will result in reductions in manpower force structure requirements as compared to one AOE Ammunition Co. It will reduce requirements about 139 spaces per Co. However, the TAA-05 process may require more Mod Ammo Co's than the number of AOE Ammo Co required by TAA-03, thus resulting in an overall increase in manpower requirements.

[This study team elected to assign a "Decrease" based on the known/planned effects of replacing one current Ammunition Co with one proposed Mod Ammo Co.]

18. Related changes in CSS efficiency. Increase.

[Refer to the initial Description paragraph for proposed increases in Mod Ammo Co efficiencies over the current system.]

19. Related changes in CSS effectiveness. Increase.

[Refer to the initial Description paragraph for proposed increases in Mod Ammo Co effectiveness over the current system. Proposes Mod Ammo Co will be able to move 150,786 ST of CL V per day compared to the current AOE AMMO CO's 126, 000 ST per day.]

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself). Increase.

[Charts provided this analyst indicate an increase in equipment requirements (PLS and MHE) for the USAR. Other charts show for one proposed Mod Ammo Co, for example, an increase in 53 10-ton jacks but a reduction in the number of mechanic's tool kits. Further, charts also indicate that going from the current 23 TAA-03 Ammo Co's (MOADS PLS) to the proposed Mod Ammo Co's would require an increase in say 132 HMMWVs. Also, the CASCOM SME was uncertain of any possible requirements for increases in automation equipment.]

b. In organization(s). Increase.

[Charts provided this analyst indicate (a) for the current Ammo Co: 10 ASP (DS), 9 CSA (GS) and 4 TSA (GS) ; and (b) for the proposed Mod Ammo Co: 23 CO HQs, 36 Heavy Lift Platoons, and 44 Medium Lift Platoons.

21. Status of CSS E/I Operational Concept. Developed.

HQ TRADOC advised CASCOM not to develop an Operational Concept, but rather to develop a "Reorganization Proposal." Such proposal was approved in Mid 1996 by the Chief, Ordnance.



[This study team assigned a "Developed" using a Reorganizational Proposal in lieu of an Operational Concept.]

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. N/A.

No MNS required.

b. ORD. N/A.

c. BOIP. N/A.

23. CSS E/I training in TRADOC schools. Unknown.

24. Examined in

a. TF XXI AWE (Mar 97). No.

b. TRAC's Div design Analysis Study. No.

c. The Nov 97 DAWE. No.

25. Tested elsewhere. No.

But this concept will be tested in Jun 98 with the USAR (38th ORD GP) at the Bluegrass Army Depot, Kentucky.

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. No.

The added equipment requirements are not in the current POM /EPP since this concept has not yet been approved by HQDA.

27. Planned BOIP (connectivity between FP). Yes.

Plans call for fielding this concept to all 23 Echelon above Division Ammo Co.

28. Technical capabilities. N/A.

No new technical capabilities are being added to these units.

29. LIA's 15 elements of ILS assessment. N/A.

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). Unknown.

[SME responded "N/A. The Mod Ammo Co is an EAD unit." However, given the information in paragraph 26 above and 30b below, this study team elected to assign an "Unknown" to the Corps-level Mod Ammo Co being available "to support" the First Digitized Division.]

b. In time for the First Digitized Corps (2006). Unknown.

[SME responded "Yes. Plans call for converting the III Corps Ammunition Company to this concept. However, this is contingent on HQDA approving the concept and appropriate funding." Based on this, this study team thinks that a more appropriate response would be an "Unknown."]

c. During FY 07-10. Unknown.

31. Overall Peacetime (Programmatic) risk. Amber.

The concept is not yet approved for use in TAA-05 and has not been tested to date (May 97). Once the concept is approved, funds must then be appropriated for the POM and EPP.

[This study team would have assigned a "Red" peacetime risk except for the fact that there is an approved "Reorganizational Approval."]

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.

The new Mod Ammo Co would likely suffer the same threat as current Ammo Co's. Also, it should be noted that HQ Forces Command has verbally concurred in resourcing at 100% level the planned COMPO 1 Mod Ammo Co's by crossleveling existing COMPO1 Ammo Co's.

33. Likelihood of prerequisite C,CS or CSS E/I wartime degradation. N/A.

34. Wartime backup (BU) system. No BU unit available.

[Backup system could be to have a similar unit from elsewhere on the battlefield take over the mission of the degraded Mod Ammo Co.]

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. N/A.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. Low.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Medium.

[The CASCOM SME did not provide a rating of this impact. However, he provided the following discussion. If the Mod Ammo Co concept were only implemented in FP 1 units, then only one Corps would have it. Thus, we would not have the ability to "tailor" ammunition support packages. This in turn would place a higher demand on strategic lift assets since they would have to deploy current AOE Ammo Co's. This study team therefore assigned a "Medium."]

38. Other adverse wartime impacts (e.g., scenario dependent). N/A.

39. Overall wartime risk associated with employment of this CSS E/I. Green.

40. Overall risk (considering both programmatic and wartime risks). Amber.

[Refer to paragraph 31 above.]

41. Ordinal ranking of this CSS E/I by the CSS DCD.

42. Cardinal ranking of this CSS E/I by the CSS DCD.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities. N/A.

44. Remarks. None

45. Data Sources. Mr. David Hale, CASCOM (DCD-Ord Dir), DSN 687-0597.

1. Title. Movement Tracking System (MTS).

2. Designation. FXXI CSS Initiative.

a. Description: The MTS provides the capability to identify position, track progress, and communicate with the operators of TWV. Through the use of positioning and communication satellites, transportation movement control and mode operators can determine the location and communicate with TWV assets anywhere in the world.

b. Characteristics: The MTS is a satellite based tracking/communication system consisting of a mobile unit mounted in the vehicle and a base unit controlled/monitored by movement control and mode operators. The MTS includes a global positioning system capability, ability to send messages from base to mobile and mobile to base, and ability to locate/track the asset position on an map background using personal computer based software.

c. Mission: This capability will provide the communications and tracking necessary for all TWVs to complete and survive their distribution missions on the digitized battlefield. MTS will provide real time in-transit visibility of vehicles and cargo within a theater of operations as well as redirect cargo and units based on changes to battlefield requirements and tactical unit reallocations. It will provide embedded movement control capability, which will improve trafficability on Main Supply Routes (MSRs) and will reduce the chances of fratricide. MTS will also be used to warn of dangers, task "on the move" and perform optimal route planning.

d. Program Status: Unit Costs-\$5000 per system. Total funding required for procurement of initial quantity is \$17M. MDEP: TBD, SSN: TBD. MTS is currently being used throughout the US by commercial trucking companies. An off the shelf system can be deployed, but current development efforts will field a system meeting Army requirements. Commercial industry is currently producing variants of this system and technical risk is low.

3. DTLOMS Area.

a. Primary: Materiel.

b. Secondary: None.

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Digitization.

5. CSS BOS Function.

a. Primary: Distribute.

b. Secondary: Arm, Fuel, Fix

6. FXXI Priority. High.

CASCOM (DCD-Trans) priority #1 of 7 FXXI items.

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. High.

[MTS was prioritized # 9 out of 51 overall items, and # 4 out of 7 Transportation items.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Briefed

[Briefing charts (a) indicated that MTS was "Green" for money programmed in the POM for the First Digitized Division by FY 2000 or before, and (b) recommended an additional \$4.2M by FY 00, an additional \$6.3M by FY 03, and an additional \$10.8M by FY 06 in order to equip the FXXI Division and corps slice and to start the fill for other FP 1 units. These additional funds would equip vehicles besides PLS-E.]

9. The 1996 US Army Modernization Plan. Not Reviewed.

[This study team could find no reference to MTS in this plan.]

10. Prerequisites.

a. FXXI E/Is. None

b. Other prerequisites. CS

[This study team thinks that satellite communications is a prerequisite for successful MTS operation, be it dedicated or common use. This was not mentioned in the SME response.]

11. Overall risk status of

a. Prerequisite E/Is. N/A.

b. Other prerequisites. Unknown.

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. N/A.

b. The other prerequisites. None.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function?  
Unknown.

[This study team wants to point out that a different CASCOM SME when responding to the EODRV CEFA assessment indicated that the MTS was a "prerequisite" for his EODRV; yet, the MTS SME's response above indicated that "no other" FXXI Enabler/Initiative required the MTS. This has not been resolved to date.]

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? None.

[The CASCOM SME indicated that no other "FXXI CSS Enablers/Initiatives" would benefit by fielding the MTS. However, he responded that the MTS would definitely be of benefit to the TWV fleet.]

16. Supporting analytical studies. None

17. Changes in manpower requirements caused by fielding this given CSS E/I. None.

18. Related changes in CSS efficiency. Increase.

Based on CASCOM SME-Military Judgment: Expect 20% more efficient use of TWVs. This will permit vehicles to be tasked and managed to meet current modeling expectations.

19. Related changes in CSS effectiveness. Increase.

Based on CASCOM SME-Military Judgment: Yes, MTS will allow smaller convoys and more force protection.

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself). None.

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Developed.

An operational concept was approved Nov 96 by the US Army Chief of Transportation.

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. Yes

The MNS was "validated" in May 95.

b. ORD. Yes.

The MTS ORD was approved by HQ TRADOC on 13 Aug 96.

[CASCOM 12 Aug 97 briefing to CDR CASCOM indicated they were drafting an update to the MTS ORD, with a Sep 97 expected CASCOM completion timeline.]

c. BOIP. No.

Not yet. BOIP is under development.

23. CSS E/I training in TRADOC schools. No.

Not yet. Training Support packages are being developed.

24. Examined in

a. TF XXI AWE (Mar 97). Yes.

Preliminary test results indicate that MTS was very effective. The MTS itself experienced a 96% OR rate for the entire rotation.

[(1) Briefing charts received from the CASCOM Battle Lab on/about 17 Apr 97 concerning TF XXI emerging results indicated that "...MTS greatly enhanced the situational awareness and synchronization of materiel and movement management within the BCT. Allowed the BN Security, Plans and Operations (SPO) office to track fuel trucks and other BN assets. The system is well liked by the soldiers and functions almost flawlessly, and maintains a greater than 98% availability rate....On several occasions during the AWE MTS was used to divert vehicles away from dangerous areas after receiving spot reports from higher headquarters.]

(2) Briefing charts for the CDR CASCOM's 23 Apr 97 briefing to the C&GSC indicated.

(3) CASCOM Battle Lab briefing concerning TF XXI emerging results presented to Congressman Sisisky on/about 14 Apr 97 indicated that "...PLS-E(with MTS) is a Big Plus...CSS successful initiatives: PLS-E/MTS."

(4) TRAC-LEE's May 97 TF XXI emerging results briefing as well as the CASCOM's 9 Jun 97 TF XXI briefing to BG Dayan (Israeli Army) both indicated results similar to all of the above.]

b. TRAC's Div Design Analysis Study. No.

c. The Nov 97 DAWE. No.

25. Tested elsewhere. Yes.

The Defense Transportation Tracking System (DTTS) variant of MTS is in use to support OJE. Also, similar technology is being used worldwide (commercial and in Saudi Arabia by US Forces).

[SME did not have results of the MTS employment in OJE.]

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. Yes.

\$3M per each year (FY 99,00,01,02); and \$4M for FY 03. Continual Research & Development work is underway by CASCOM (both the ISD and the DCD-Trans) to integrate the MTS into STAMMIS. WRAP funding for FY 97 and FY 98 is \$3M each FY to buy 432 MTS (to equip PLS vehicles for two divisions plus selected Corps support units). CASCOM has an UFR for funding MTS to all other non-PLS TWV. Total Army MTS requirement is for 12,636 systems.

27. Planned BOIP (connectivity between FP). Yes.

Plans call for fielding MTS to all four FP. However, current funding is inadequate to do so.

28. Technical capabilities. Proven.

The MTS consists of vehicle mounted mobile and base controller units. It provides real time intransit visibility of vehicles and cargo through the use of positioning and communications

satellites and personal computer mapping software. Technical capabilities include: digital display; self contained, low profile; vehicle transferable (Portable); position location within 100 meters; movement control, route planning, locate and track assets; worldwide, 24 hour coverage; communications pipeline for other data. The DTTS variant of MTS is in use to support OJE. Also, similar technology is being used worldwide (commercial and in Saudi Arabia by US Forces).

29. LIA's 15 elements of ILS assessment. Unknown.

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). Yes.

The First Digitized Division will get MTS by FY 98, but only for PLS and not for all other TWVs (no money).

b. In time for the First Digitized Corps (2006). Yes.

The First Digitized Corps will receive MTS by FY 99 (only for PLS).

c. During FY 07-10. Yes.

The rest of the Army by FY 03 (but only for PLS).

31. Overall Peacetime (Programmatic) risk. Amber.

Due to a lack of funds the MTS is rated "Red" for fielding to all TWV less the PLS. However, it is rated "Green" for fielding to PLS vehicles only.

[The CASCOM SME broke out the MTS requirement into two sections: (a) for PLS, and (b) for non-PLS vehicles. For PLS, he rated the overall peacetime risk as "Green", and for the non-PLS he rated the overall risk as "Red" due to lack of funds. This study team elected to assess the MTS in a holistic manner, thereby assigning an overall peacetime/programmatic "Amber" risk to the MTS. To have assigned a "Red" overall to the entire MTS program would not have done justice to the current PLS MTS plans. Thus the "Amber" overall rating.]

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.

We expect a low likelihood of battlefield degradation except for when operating in an EMP environment. There have been no EMP tests done on the MTS.

33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation. N/A.

34. Wartime backup (BU) system. Manned checkpoints to establish communications with vehicles that can be persuaded to stop. Possible SINGCARS communications. Also, all MTS installation kits will be mounted on vehicles such that the MTS can be swapped out and interchanged between vehicles. So, if one MTS becomes inoperative, then a possible BU could be to obtain a different one from a vehicle which is not in service.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. N/A. There will likely always be some form of BU system available.



36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. High. We could not obtain the synergistic benefits demanded from battlefield Distribution, Velocity Management and Intransit Visibility. Could not do force projection. Also, success in the next major war on a fluid battlefield where traditional lines of communications are not established/possible will require a high tempo of distribution and resupply to provide CSS services to commanders.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Medium. Fielding MTS to only selected FP would adversely affect Division/Corps management of distribution assets. Only these selected units could then implement the new BD doctrine.

38. Other adverse wartime impacts (e.g., scenario dependent). None.

39. Overall wartime risk associated with employment of this CSS E/I. Green. High reliability; BU's exist.

40. Overall risk (considering both programmatic and wartime risks). Amber.

[The CASCOM SME broke out the MTS requirement into two sections: (a) for PLS, and (b) for non-PLS vehicles. For PLS, he rated the overall risk as "Green", and for the non-PLS he rated the overall risk as Red due to lack of funds. This study team elected to assess the MTS in a holistic manner, thereby assigning an overall "Amber" risk to the MTS. To have assigned a "Red" overall to the entire MTS program would not have done justice to the current PLS MTS plans. Thus the "Amber" overall rating.]

41. Ordinal ranking of this CSS E/I by the CSS DCD.

42. Cardinal ranking of this CSS E/I by the CSS DCD.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities.

44. Remarks. None

45. Data Sources. Mr. Tom Snodgrass, CASCOM (DCD-Trans Dir) and MAJ Ed Ogburn, CASCOM (DCD-TRANS), DSN: 687-0492. CASCOM Sep 96 CSSMMP and related May 97 updates.

1. Title. Multicapable Maintainer

2. Designation. FXXI CSS Enabler.

The Multicapable Maintainer will reduce maintenance manpower requirements.

[Notes: (a) The CASCOM SME wanted to cite that this FXXI enabler should also be considered as an AAN enabler under the Ordnance Vision for the 21st Century. "... Emerging design criteria for AAN envision that there will fewer if no CSS MOSs in front line AAN fighting units. Force/Army XXI organizations. These trends will require the Ordnance Corps to make further skill consolidations. For example Force XXI wheel and track MOSs may be consolidated to just automotive. Additionally log support bases behind fighting units will also be much smaller and more capable than Therefore the move to consolidate current Ordnance CMFs MOSs is a supporting move to AAN."]

(b) The following dated Mar 97 was submitted by the CASCOM SME as the only available Fact Sheet describing the Multicapable Maintainer. It describes the Skill Consolidation Study which forms the basis for the Multicapable Maintainer.)

Subject: Skill Consolidation Study

Background: Provide information concerning the ongoing Ordnance Corps Skill Consolidation Study.

In 1989, the Army began facing the realities of reducing its end strength and modifying its force structure. A critical element in this "downsizing" process is restructuring the existing job structures; i.e., MOS restructuring.

In addressing the impacts of a rapidly changing force structure, a major concern for the USAOC&S has been whether the existing enlisted Career Management Fields (CMF) within the Ordnance Corps will need to be restructured and their MOS modified. The Ordnance Corps was also attempting to determine what impacts technology would have on the maintenance workforce. Because the Ordnance Corps maintenance concepts were expanded to link industrial base capabilities to battlefield maintenance units (i.e. consider the military and civilian workforce as a single unit) the USAOC&S was able to secure funding for the project through the Strategic Logistics Agency (SLA).

The study was designed to answer four questions as well as design and develop a prototype database tool to assist in the analysis.

What are the optimal maintenance MOS to sustain the total force?

What is the optimal mix of maintenance skills for each MOS?

What should the Ordnance Corps notional force structure and training be for FY 96?

What impact will technology have on the maintenance personnel structure?

## Facts:

The initial 18 month study was completed Jan 93. The effort looked at 56 MOS in CMF 27, 35, 55, and 63. The study examined what maintenance skills are required to support equipment systems through the year 2006. Results articulate manpower, personnel, and training changes required to make initial structure changes beginning in FY95.

**Evaluation Process:** The first step in the study process was to develop a list of enabling criteria or knowledge encompassing all study MOSs. The initial list was prepared by the contractor team based upon review of Ordnance programs of instruction and AR 611-201 requirements. The second task was to identify major equipment systems for each MOS that would be in the Army inventory through the year 2000. Once the equipment lines were identified the contractor team loaded the Maintenance Allocation Charts (MAC) charts for the system into the database tool. SME panels were then assembled consisting of at least two MOS specific personnel and a senior warrant officer from the career MOS grouping. The individual panels validated associated MOS enabling criteria and equipment lists ensuring they were appropriate for their MOS. Then panel members assigned enabling criteria, and training requirements for each MAC task associated with a given line of equipment. Data was collected on 60 plus systems repaired by Ordnance technicians.

During the second phase of the study data collected from the equipment panels was analyzed and notional MOS were recommended based on high degrees of commonality in maintenance tasks and enabling criteria. The process was the Ordnance Corps first look across all it proponent MOS. The results were briefed to MG Wilson who approved the initial study MOS for follow on detailed study.

The next step was to analyze manpower, training, and personnel requirements for the notional MOS. For each element where there was a major issue or shortfall in force structure, training or personnel (Armed Services Vocational Aptitude Battery (ASVAB) aptitude area scores, accession or retention), tradeoffs or issue sheets were developed. Concurrently other panels were meeting with the Army Science Board and Civilian Personnel officials. The technology panel forecast how technology would change enabling criteria validated during the study. CPO representatives assisted panel member review proponent wage grade job specifications to ensure they were properly aligned with Ordnance MOS and could meet changes brought about by technology evolution.

Final results were presented to MG Coburn on 19 Mar 93. During the meeting MG Coburn approved the consolidation of 19 MOS to 6. Two of the new MOS (Power Generator and Special Purpose Repair) were approved for training implementation. The remaining 4 MOS; Track, Wheel, Armament, and Electronic Optics will require additional study to assess ITRO and RC impacts.

LTG Wakefield was briefed on study results 6 Aug 93.

Current effort is focused on updating force structure figures to implement Army Regulation (AR) 611-201 changes, evaluating multicapable mechanics in Force XXI Prairie Warrior exercises, and completing analysis of new Electronic/Optic repair MOS in CMF 29 and 68.

In Dec 93, the USAOC&S requested additional funds from SLA to do two things. First, to construct notional TOEs utilizing the new MOS, and complete the cost analysis to determine manpower savings. Second is to update the Skill Consolidation MOS data base. Due to lack of resources, at both schools and SLA, the analysis effort was not completed. Redstone is continuing the effort to develop data for the MOS transferred to the Ordnance Corps from the Signal and Aviation branches. Additionally Redstone has opened a dialog with the Military Intelligence Branch to include their electronic repair MOS in the effort.

In May 95 MG Jordon, Commander, USAARC&S asked MG Monroe, Chief of Ordnance to consider consolidating MOS 45E10 with 63E10 and 45T10 and 63T10. The recommended consolidation would track USMC training. MG Monroe agreed with the recommendation for a joint study and responded by stating that "Ordnance Vision XXI" supports movement toward a more "generic maintainer. In FY 96 CEP funds were secured to initiate a study. The CEP looked at both the Armor School proposal of developing a M1/ M2 mechanic and a sub-system mechanic as outlined in the 1993 effort. Following detailed analysis by USAARMS, USAOC&S and CASCOM personnel, MG Maggart and MG Shadley selected two refined MOS proposal for field testing. CEP 215, the field testing phase, began in October 1996. During the CEP training has been modified to provide Ft Carson and Ft Riley soldiers per the new concept designs. Following completion of field testing a decision will be made on the best MOS design to support the Army.

### 3. DTLOMS Area.

- a. Primary: Training.
- b. Secondary: Doctrine, Organization, Soldiers.

### 4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Both.

Technology and modernization of Army's equipment is one of the driving forces behind fielding multicapable mechanics. Generally all Ordnance MOS need additional electric and electronic theory to diagnose, replace and repair digitized equipment appearing in Army organizations.

### 5. CSS BOS Function.

- a. Primary: Fix.
- b. Secondary: None.

### 6. FXXI Priority. High.

Reference: MG Monroe's May 1995 article; "Ordnance Vision" : We must modify Ordnance training to develop generic skills..skills that will be compatible with national training standards.... Ordnance Functional Area assessment presented to the Vice CSA Aug 1995 by MG Shadley articulating the need to consolidate MOS.

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. N/A.

[The Multicapable Maintainer is not a materiel item and therefore was not mentioned in this plan.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. N/A.

[The 1996 WFLA did not include any personnel or organization issues. Focus by TRADOC directive was on materiel and equipment modernization.]

9. The 1996 US Army Modernization Plan. N/A.

[The Multicapable Maintainer is not a materiel item and therefore was not mentioned in this plan.]

10. Prerequisite(s).

a. FXXI E/Is. None.

The Multicapable Maintainer can stand alone and requires no FXXI E/Is. It is conjectured that without the synergy caused by employing various FXXI CSS E/Is, we may only realize up to a 10% reduction in this mechanics Indirect Productive Time (IPT). However, with the use of FXXI CSS E/Is we might realize up to a 75% reduction in his IPT. In that context the following are FXXI CSS maintenance prerequisites: (a) Enablers- CMT, IRV, FRS-H, all IFTE, TEMOD, and FAMPs, and (b) Initiatives- PUMA, Driver Minder, SACIMS, ETM, IETM, MARSS, Light Weight Maintenance Enclosure, CSSCS, FBCB2 (CSS applique), and ICS3.

b. Other prerequisites. CS, CSS.

Merging maintenance levels and fielding mechanics/ technicians to work in division XXI motorpools will reduce the existing AOE ground maintenance Ordnance footprint. Fielding Multicapable Mechanics alone, however, will not provide commanders the full range of maintenance capabilities required to support the new divisions. Specifically, mechanics must be linked through communications systems to logistic automation systems to acquire class IX, diagnostics assistance, coordinate maintenance management and recovery support. Without these enablers the maintenance system as a whole will be sub-optimized and the divisions warfighting capability minimized.

[This study team thinks that ... "Specifically, mechanics must be linked through communications systems to logistic automation systems to acquire class IX, diagnostics assistance, coordinate maintenance management and recovery support" is referring to (a) some of the FXXI CSS E/I prerequisites discussed in the above paragraph (i.e.; FBCB2, ICS3, CSSCS), and (b) the need for "communications systems."]

11. Overall risk status of

a. Prerequisite E/Is. N/A.

[As cited in paragraph 10a above, the Multicapable Maintainer "can stand alone and requires no FXXI E/Is." However, given the synergy that each maintenance FXI CSS E/I can bring to this

Multicapable Mechanic, the following overall risk assessment ratings are cited from individual CEFA reviews.]

- |                            |                                      |  |
|----------------------------|--------------------------------------|--|
| (a) CMT: "Green"           | (b) FRS-H: "Red"                     | (c) IFTE (ERS: "Amber", SPORT: "Amber", EOTF: "Amber") |
| (d) TEMOD: "Amber"         | (e) FAMPS: "Red"                     | (f) PUMA: "Red"  |
| (g) Driver Minder: "Amber" | (h) SACIMS: "Red"                    | (i) ETM: "Amber"                                       |
| (j) IETM: "Amber"          | (k) MARSS: "Amber"                   | (l) LT WT Maint Encl: "Amber"                          |
| (m) CSSCS: "Green"         | (n) FBCB2-CSS Functionality: "Amber" |  |
| (o) ICS3: "Green"          | (p) HERCULES (IRV): "Green"]         |  |

b. Other prerequisites. Unknown.

[Specific information was not provided by the CASCOM SME on estimated risks associated with the "other" prerequisites (refer to paragraph 10b above: "Specifically, mechanics must be linked through communications systems to logistics automation systems...")]

## 12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. N/A.

[However, the CASCOM SME indicated that the Ordnance Corps will not be able to support the design parameters of TRADOC Pam 525-5, FORCE XXI OPERATIONS if the synergy is not realized from use of the FXX CSS E/Is listed in paragraph 11a above. Further, the CASCOM SME indicated that this Pamphlet addresses the entire Army (Active Duty, Army Reserve, National Guard and Department of the Army Civilians) and describes a FXXI concept for the evolution of full-dimensional operations for the strategic army of the early twenty-first century. Chapter four "Implications" discusses FXXI implications in each of the DTLOMS areas, to specifically include Materiel. The CASCOM SME indicated that if the Multicapable Maintainer concept is not fielded, then such will adversely impact on attainment of the goals discussed in this Pamphlet.]

b. The other prerequisites. Medium.

Ordnance Corps will not be able to support the design parameters of TRADOC Pam 525-5, FORCE XXI OPERATIONS.

[The CASCOM SME indicated that without the Multicapable Maintainer the "other" prerequisites will not realize their full potential, thereby in some way keeping the Army from obtaining all the goals set forth in this Pamphlet.]

## 13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function?

None.

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? Specify

[SME responded "None." However, this study team thinks that most all systems (perhaps some FXXI Combat or CS systems designated as FXXI enablers/initiatives) requiring maintenance will benefit in some manner from the Multicapable Maintainer concept.]

16. Supporting analytical studies. Yes.

The 1993 Ordnance Corps Skill consolidation Study, examined current equipment and emerging technology to determine what skills the Ordnance Corps would require early in the first decades of the 21<sup>st</sup> Century. It also attempted to link military skills and related civilian skills. Study results recommending merger of several CMF 63 MOS were briefed and approved by MG Coburn and LTG Wakefield in 1993. LTG Wakefield guidance was to push forward with the effort and determine the impact on force structure and training costs. Due to lack of resources and models a detailed analysis was never completed. CEP funding was acquired in 1995/1996 to examine merging MOS associated with the M1 and M2/3 vehicles. Currently there is an ongoing effort, TRADOC CEP 215, examining two different methods for consolidating track MOS at Ft Carson. The CEP is scheduled to be completed in Sep 97.

[This study team also obtained a copy of the OC&S 24 Oct 96 "Final Report, Concept Evaluation Program Study 222, MOS Consolidation Study." In part the abstract reads: "...Based on an economic analysis of this phase A in CEP 222 it was proven that to consolidate is cost effective rather than to remain status quo." A cursory review of this economic analysis by this study team indicates that it was primarily a "cost analysis." Of interest is the possible absence of analysis showing that the alternative of "consolidating" maintenance MOS is more "operationally" effective (read that such action will increase Operational Readiness (OR) rates of major end items). Such consolidation may save the Army money/avoid future dollar spendings, but does it also increase OR rates? (Hopefully there is analysis to show that such will not "decrease" OR rates). Also, as discussed in paragraph one of this assessment, the "Ongoing Ordnance Corps Skill Consolidation Study" had four study questions: "...The study was designed to answer four questions as well as design and develop a prototype database tool to assist in the analysis.

What are the optimal maintenance MOS to sustain the total force?

What is the optimal mix of maintenance skills for each MOS?

What should the Ordnance Corps notional force structure and training be for FY 96?

What impact will technology have on the maintenance personnel structure?"

Again, noticeably absent from such verbiage is any reference to "increases in OR rates over the present method of maintenance." This study team would like to have been provided analytical support which showed that the Multicapable Maintainer concept will provide OR rates "equal to or better" than our present way of doing business. Please refer to the following paragraph on "Changes in manpower requirements" for further discussion on this analytical support issue.]

17. Changes in manpower requirements caused by fielding this given CSS E/I. Decrease.  
Decrease.

Fielding the Multicapable Maintainer will decrease the overall number of Ordnance personnel. Analysis to compute the magnitude of the overall saving has not been developed as decisions on EAD structure are still pending.

Initial milestones for designing the support structure for FORCE XXI did not permit time for detailed analysis. By merging the organizational and direct support maintenance activities it was estimated that approximately 80-90 mechanics positions per brigade could be deleted. The logic for making the decrease was merger of the maintenance levels would allow for reduction in maintenance supervisors. Follow on analysis focused on reduction in indirect productive time and incorporated subjective values for Force XXI enablers. Currently 840 hours are allocated by MARC calculations for indirect productive time. Linking the multicapable mechanic to communication devices that provided access to onboard sensors, diagnostic tools, the supply system, maintenance management automation, and equipping the personnel with mobile maintenance platforms able to keep pace with supported units could reduce indirect productive time by up to 75%. There was no attempt to analyze direct productive time because there are no ongoing equipment design improvements that will allow for any reductions to maintenance allocation chart tasks.

Fielding the Multicapable Maintainer will decrease the overall number of Ordnance personnel. Analysis to compute the magnitude of the overall saving has not developed as decisions on EAD structure are still pending. Moving to the new structure will have offset training, organization, and materiel costs which must be factored against force structure savings to calculate total saving.

[It should be noted that this concept was briefed at the CASCOM to the CDR TRADOC on 3 Apr 97. Briefing slides state "Potential space savings- 273 spaces in a 4 x 5 HVY Division." Also, this study team discussed with personnel organizing the upcoming Multicapable Maintainer CEP the issue of somehow validating the assumption that the Multicapable Maintainer "when using all the planned maintenance FXXI CSS enablers/initiatives" may in fact actually realize a decrease in "up to" 75% of his IPT. (The figure "75%" was used to derive the upper bound of 273 reductions in maintenance requirements- as briefed to CDR TRADOC.) Granted, the number 273 and the hypothesized "up to" 75% reduction in IPT are based on synergistic use of enablers/initiatives WHICH ARE NOT YET FIELDED. Thus, the question remains as how to surrogate them in some test/analysis in order to analytically support the assertion of "reductions in maintenance requirements of up to 273." This is no easy task; however, this study team thinks that if such has not yet been analytically reviewed, then it should be the number one study issue for the upcoming CEP. Once it has been determined that the Multicapable Maintainer provides us with (a) an OR rate AT LEAST EQUAL TO OR GREATER than our business-as-usual procedures, and (b) a reduction in "up to" 75% of his IPT, then we should concern ourselves with testing to determine which of the two Multicapable Maintainer options ("horizontal" or "vertical") is the better way to go. Notionally, what if in the end we elect to go with the "horizontal" Multicapable Maintainer assuming it tests out better than the "vertical" option, and what if this "horizontal" way is in fact economically "cheaper" than our present "business-as-usual", only to later find out that it provides us in wartime with a "decrease" in OR rates???? This study team was advised that such can not now be examined/is not an issue for the upcoming CEP.]



18. Related changes in CSS efficiency. Increase.

Merging the 20/30 maintenance levels within division motor pools will eliminate the reinspection, and transfer of item of equipment to DS maintenance activities.

19. Related changes in CSS effectiveness. Increase.

Multicapable Maintainers will reduce the number of MOS allowing for saving in force structure, personnel management, and align Ordnance MOS to mirror National Skill Standards. Linking soldiers to national skill standards will facilitate integration of contractors on the battlefield, assist recruiting and shorten training of technical skill during mobilization.

[It should be noted that no information could be obtained by this study team indicating that increases in weapon system OR rates might be realized by implementing this concept.]

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself).

Unknown.

Moving to the new structure will have offset training, organization, and materiel costs which must be factored against force structure savings to calculate total saving.

b. In organization(s). Unknown.

21. Status of CSS E/I Operational Concept. Developed.

Integrated in the Maintenance XXI Concept; and Ordnance Corps Vision.

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. N/A.

b. ORD. N/A.

c. BOIP. N/A.

23. CSS E/I training in TRADOC schools. No.

The Multicapable Maintainer concept is not yet being trained in TRADOC schools.

24. Examined in

a. TF XXI AWE (Mar 97). Yes.

Concept simulated during the Force XXI AWE.

[TEXCOM formal test results not available as of this writing. Also, informal CASCOM tests results were not provided to this study team for reporting in this CEFA. However, the CASCOM 9 Jun 97 TF XXI AWE briefing slides as presented to BG Dayan (Israeli Army) read in part: "...CSS Reorganization- Number of Mechanics might be insufficient."

b. TRAC's Div Design Analysis Study. No.

c. The Nov 97 DAWE. Yes.

25. Tested elsewhere. YES.

Currently the Ordnance Center and School and Armor School are testing two competing multicapable MOS designs for supporting the M1 and Bradley at Ft Carson. Multicapable Soldiers have been on site about three weeks. Analysis of the MOS design is scheduled to be completed o/a Sep 97.

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. N/A.

[Only the aforementioned CEP test is funded. The SME responded "No" to this question. However, since this initiative is primarily a "Concept" and not acquisition of new materiel per se, this study team thinks that POM (OPA) funding may not be needed (but OMA funds would be). Therefore, this study team assigned a "N/A."]

27. Planned BOIP (connectivity between FP). Yes.

The Multicapable Maintainer concept is planned for implementation Army-wide.

28. Technical capabilities. Unproven.

29. LIA's 15 elements of ILS assessment. N/A.

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). No.

Selected MOS could be fielded in limited numbers, but it is doubtful that the training base could provided full TOE authorizations. Through on-site field training shortfalls could be minimized.

b. In time for the First Digitized Corps (2006). Yes.

If training analysis begins in 1998 with new training starting in 1999, all the affected Ordnance MOS should be in place by 2004.

c. During FY 07-10. Yes.

Changing existing MOS to the new designs should be complete by 2004.

31. Overall Peacetime (Programmatic) risk. Amber.

The National Guard and Reserves have voiced concern that readiness in their units may drop due to the MOS consolidation. The readiness risk is considered minimum given the magnitude of other changes initiated by the Force XXI concept.

[This study team agrees that the risk is "Amber," but rationale for such rating is also based on the fact that this CEFA was not provided any supporting information (beyond assumptions) that (a) the new concept will likely provide weapon system OR rates at least equal to or better than the current business-as-usual, and (b) the new concept will actually realize "up to" a 75% reduction in a

Multicapable Maintainer's IPT. Such needs testing which must include the yet-to-be fielded/many unfunded new FXXI CSS enablers/initiatives; therefore, only time will tell.]

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.

Same as the unit in which the Multicapable Maintainer works.

33. Likelihood of prerequisite C,CS or CSS E/I wartime degradation. N/A.

[The CASCOM SME indicated that there are no true "prerequisites" for the Multicapable Maintainer. However, the magnitude of the effectiveness of this maintainer derives from the synergy realized from the employment of several other FXX CSS initiatives. Refer to other CEFA assessments for the prerequisite FXXI CSS enablers/initiatives cited in paragraph 11 above.]

34. Wartime backup (BU) system. Use of Multicapable Maintainers from sister units, use of AMC Logistics Support Elements (LSE), use of LOGCAP.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. Medium. More work will have to be passed back to AMC and the industrial base.

[Generally speaking some form of BU would be available if one or more Multicapable Maintainers were killed or wounded.]

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. Medium.

More work will have to be passed back to AMC and the industrial base.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Medium.

Plans call for implementing this concept Army-wide. However, if some units did not convert to this concept, then we would need to have a dual personnel management system, possibly resulting in limited wartime replacement (of mechanics).

[Also units not receiving this new concept might not realize the assumed/planned synergistic maintenance benefits. SME responded "None." However, based on the above, this study team assigned a "Medium."]

38. Other adverse wartime impacts (e.g., scenario dependent). None.

39. Overall wartime risk associated with employment of this CSS E/I. Green.

40. Overall risk (considering both programmatic and wartime risks). Amber

[None provided by CASCOM SME. This study team rated the overall risk as "Amber" based on the aforementioned paragraph 31 peacetime risk assessment.]

41. Ordinal ranking of this CSS E/I by the CSS DCD.

42. Cardinal ranking of this CSS E/I by the CSS DCD.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities. N/A.

44. Remarks. None

45. Data Sources. Mr. James Arnold, CASCOM (DCD-Ord Dir), DSN 687- 2040.

1. Title. Multi-Technology Automated Card (MARC)

2. Designation. FXXI CSS Initiative

a. Description: The MARC is an ID Card size reader device serving as an electronic identification key and limited data carrier for the individual soldier.

b. Characteristics: The MARC has a read and write capability that will interface with current PSS STAMIS.

c. Requirements/Need/Mission: The MARC eliminates duplicate data entry, increases data input accuracy, reduces communication requirements, reduces functional processing time and guarantees data. It evolved from the old Soldier Readiness Card that was designed to support soldier accountability, readiness, movement control and essential battlefield PSS functions (medical treatment, combat casual pay and casualty evacuation). The systems provides a means to support the Army as it moves to a CONUS-based force capable of projection into austere contingency theaters. The MARC and its interface/use with the ARCIS will serve limited automation capability that accompanies the initial force into theater and continues to provide capability to process limited functions and data in a distributed stand-alone mode.

3. DTLOMS Area.

a. Primary: Materiel.

b. Secondary: Soldiers.

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Both.

5. CSS BOS Function.

a. Primary: Man.

b. Secondary: Arm, Distribute.

Arm and "sustainment" aspects of the Distribute function are secondary operating systems.

[No explanation provided from AG School.]

6. FXXI Priority. High.

Based on TRADOC Pam 525-5, Force XXI Operations.

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. None.

[The MARC was not listed in this plan.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Briefed.

[Briefing charts indicated (a) that HQ TRADOC requested MARC Cards receive an additional \$6.2M by FY 00, and additional \$18.6M by FY 03, and an additional \$21M by FY 06, (b) that MARC is the "Basis for digitizing the PSS system. Funding to equip FP1/2 in POM and FP 3/4 in EPP," and (c) that MARC was rated "Red" for money in the POM or programmed to be in the POM for the First Digitized Division.]

9. The 1996 US Army Modernization Plan. Not Reviewed.

[The MARC was not discussed in this plan.]

10. Prerequisite(s).

a. FXXI E/Is. None.

b. Other prerequisites. None.

11. Overall risk status of

a. Prerequisite E/Is. N/A.

b. Other prerequisites. N/A.

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. N/A.

b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function?  
None.

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? Specify.

[FBCB2-CSS Functionality (personnel and medical applications) and the CSSCS will benefit from updated MARC information. Also, the AMEDDC&S' CEFA input indicated that their IM Integration and MC4 FXXI initiatives each need the MARC in order to "realize their full potential." Also, the Finance Schools' CEFA input for their Defense Battlefield Finance System (DBFS) FXXI CSS initiative indicates a similar need for the MARC card ("to realize its full potential").]

16. Supporting analytical studies. Yes.

Quite a few economic analyses were performed in the last few years, within the last one done in 1994 by the Systems Research & Application (SRA) Corporation. Of interest is the draft report of the May 94 MARC preliminary Functional Economic Analysis prepared for the Deputy Assistant Secretary of Defense for Information Management by SRA. The Executive Summary indicates the MARC Net Positive Value of \$346,570,000 represents the potential value savings of the MARC in FY 94 dollars.

[a. The above SRA report was labeled "draft"; this study team does not know if such report was ever finalized/approved. Also, a clear understanding of the report's conclusions could not be obtained from pages extracted from the Executive Summary. However, report verbiage tends to indicate that implementing MARC is economically desirable over an established "baseline" (not sure what this baseline is).

b. This study team obtained a copy of the 1 Oct 96 final draft report on MARC presented by the US Army MARC Executive Agent to the Joint Staff and the Office of the Assistant Secretary of Defense for Command, Control, Communications and Intelligence. The MARC Executive Agent was tasked to prepare a MARC Functional Economic Analysis/Business Case & MARC Operational Evaluation. This study team does not know if this report was ever approved. This report reads in part:

(1) "...The MARC Operational Evaluation assesses the technical and functional feasibility of a multi-technology, multi-application, multi-function, cross-Service and cross-population card during the two-year proof of principle test in Oahu. It evaluates the MARC's feasibility by examining the concept, management, and issuance process of the MARC project."

(2) "...The MARC Evaluation proved four important enhancements which the MARC tests provided the US military: (1) MARC provides multiple technologies with updatable capacity, supporting multiple functional areas and eliminating the need for single-use, non-standard DOD cards, (2) MARC is acceptable for use by individual card holders, application users, and functional proponents, (3) MARC improves functional processes and eliminates redundant processes such as repeated data entry, and (4) the MARC is durable in a field environment."

(3) "...Besides the MARC's qualitative improvements provided in the above areas, Activity Based Costing (ABC) analysis demonstrates cost savings of \$475.56M with full scale implementation of the MARC for the US Army. Based on the investment cost of \$20.3M needed to issue the MARC to the US Army active duty component and infrastructural costs of \$55.7M to support the above functional areas, the discounted cost savings achieved through MARC implementation is estimated to be more than six times that of the program's recurring and non-recurring costs, and savings will exceed costs after 1,05 years.'

(4) "... Conclusion. Through each of the enclosed analyses, the MARC Project Management Team and Functional Proponents believe that the MARC shows demonstratable cost savings and functional improvements over existing processes in an array of applications, and should be implemented if these goals wish to be realized."]

17. Changes in manpower requirements caused by fielding this given CSS E/I. None.

[This study team was advised on 3 Mar 97 by the Director, Combat Developments, AG School that no reductions in manpower requirements are expected by fielding the MARC.]

18. Related changes in CSS efficiency. Increase.

[Refer to above draft report.]

19. Related changes in CSS effectiveness. Increase.

[Refer to above draft report.]

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself). None. Fielding the MARC system will not increase equipment requirements in other areas.

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Developed.

There was an approved MARC Operational Concept several years ago.

[No copy of this concept was available for this study team's review. However, this study team was advised to contact a now-retired former AG School officer who apparently developed this concept. Limited CEFA study resources precluded such further contacts.]

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. Yes

[SME responded in May 97 that a MNS was in the process of being developed by the PM MARC at Ft Belvoir. However, a 12 Aug 97 CASCOM briefing to the CDR CASCOM indicated that a MNS for a Joint SMART card was approved 29 May 97.]

b. ORD. No.

[SME responded "Unknown." However, the latter 12 Aug 97 briefing indicated that the ORD was pending a "30 Jun 97" (sic) JROC approval.]

c. BOIP. No.

Not developed yet. Planned BASIS OF ISSUE/TOTAL REQUIREMENT: One per individual. A wide range of interfaces for MARC has been developed and tested. Included are ARCIS (readiness



and manifesting); Army Food Management Information System (AFMIS); Composite Health Care System (CHCS); USAF-CAPSII (AF manifesting); Joint Personnel Asset Visibility (JPAV) and; US Transportation Command (TRANSCOM)- Tracking and Casualty Evacuation System (TRACES).

[This study team understands that the MARC card will be issued to every active duty soldier based on the availability of funds and in some form of priority (e.g., perhaps issue them first to soldiers in the Contingency Corps).]

23. CSS E/I training in TRADOC schools. No.

The AG School discusses the MARC card application in the AG Officer Advanced Course. But, no formal training yet on MARC.

24. Examined in

a. TF XXI AWE (Mar 97). Yes.

[OPTEC's official TF XXI report is not available as of this writing. However, CASCOM's 9 Jun 97 briefing charts to BG Dayan concerning the FMS indicate: "AWE insights- System (FMS) was used in varying degrees by each unit. Successfully used (FMS) to create deployed database for 1-5 IN either by swiping MARC cards or SSN..."

b. TRAC's Div Design Analysis Study. No.

c. The Nov 97 DAWE. NO.

25. Tested elsewhere. Yes.

MARC was tested in Oct 94 with the 25 ID (refer to paragraph 16b above). Also with the US Marines, Pacific (Aug 95) and with US Navy units in Jun 96. Test results were for the most part good. Recommended changes have been made to meet needs of each service (e.g., revamp some medical items).

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. Unknown.

[CASCOM indicated that they had no information on this matter. One AG School SME indicated that MARC is not funded in the POM/EPP, whereas another SME indicated that he was 99% sure of current POM funding for the MARC. Therefore this study team elected to assign an "Unknown" until this is resolved.]

27. Planned BOIP (connectivity between FP). Yes.

If MARC is fielded, plans call for it to go each active duty Army, Navy and Marine Corps personnel.

28. Technical capabilities. Proven.

Refer to above tests. Also, DOD won the SMART card technology of the year award for 1995 (since the Army is running more than one application on a card).

29. LIA's 15 elements of ILS assessment. Unknown.

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). Unknown.

b. In time for the First Digitized Corps (2006). Unknown.

c. During FY 07-10. Unknown.

31. Overall Peacetime (Programmatic) risk. Amber.

[One SME indicated a rating of "Green;" another indicated "Amber." This study team assigned an "Amber" due to absence of firm information about funding, refer to paragraph 26 above.]

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.

The information stored on the MARC chip is not affected by Electromagnetic Pulse. Data stored on the chip is secure in the event a soldier is captured; if the card is unsuccessfully read three times, the card will become unstable and data transfers will not occur. Also, information itself is coded onto the card, thereby making it almost impossible for the enemy to use even if they somehow got to it.

Concerning RAM: Based on tests the Army has experienced a 96% reliability success rate with the chip that is on the card.

33. Likelihood of prerequisite C,CS or CSS E/I wartime degradation. N/A.

34. Wartime backup (BU) system. There are no planned BU systems similar in nature to the MARC card itself. Loss of the MARC capability during wartime would necessitate reversal to some form of manual and less efficient/effective information collection/processing system. If an unit's standard operating procedures (SOP) required such, information on a soldier's MARC can be periodically "backed-up" by inserting his card into the MARC reader, and then storing its data in an available computer.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. N/A.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available.  
Low.

[AG School SME did not provide a direct adjectival answer. However, he indicated that the adverse consequences could very well be the loss of timely and accurate information (perhaps for some medical application or critical MOS replacement action) needed for making an important battlefield decision. But in consideration of the fact that fielding plans call for every soldier to have

a MARC just like each now has an ID card, and that there would be numerous MARC readers available on the battlefield, this study team thinks the adverse impacts would be "Low."]

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Medium.

[Units without the MARC would have to use manual methods. Also, many other FXXI enablers/initiatives (refer to paragraph 15 above) would not realize the benefits from MARC fielding.]

38. Other adverse wartime impacts (e.g., scenario dependent). None.

39. Overall wartime risk associated with employment of this CSS E/I. Green.

40. Overall risk (considering both programmatic and wartime risks). Amber

[Due to uncertainty of funding.]

41. Ordinal ranking of this CSS E/I by the CSS DCD.

42. Cardinal ranking of this CSS E/I by the CSS DCS. N/A.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities. N/A.

44. Remarks. None

45. Data Sources. AG School SMEs: (a) Primary- SFC Piccolo, DSN: 734-8448, and (b) Secondary- Mr. Jim Parker, DSN: 734-8336.

1. Title. Munitions Survivability Software (MSS).

2. Designation. FXXI CSS Initiative.

a. Description. Munitions survivability software to assist soldiers in configuring ammunition storage areas that have maximum survivability and reduced footprint.

b. Characteristics. Munitions Survivability Software is a survivability system for ammunition units.

- \* Provides 3-D display of storage area (including geographic features)
- \* Identifies risk areas and quantifies risks
- \* Recommends an optimum storage layout
- \* Recommends explosive mitigation techniques
- \* Uses explosives safety prediction codes
- \* Interfaces with existing battlefield information systems

c. Requirements/Mission. The power projection Army requires software that will assist soldiers in configuring ammunition storage areas that have maximum survivability, reduced footprint and improved efficiency. Army analyses and historical data indicate munitions are vulnerable to destruction during wartime and peace operations due to accidents, threat attack and terrorists. Ammunition storage areas are large, difficult to hide and difficult to protect. Their destruction can cripple warfighting capability by creating severe munitions shortages, can cause the loss of foothold by early entry forces and critically affect operational execution. For operational reasons, commanders often decide to store munitions stacks closer together than allowed by explosives safety regulations. This greatly increases the probability of explosive propagation between munitions stacks and may result in destruction of the ammunition storage area. Munitions survivability software is required to help soldiers understand the risks and recommend an optimum storage layout. This layout would provide maximum survivability and efficiency while reducing the ammunition storage area footprint. This software can also improve peacetime training and pre-deployment planning.

d. Milestones. Define system requirements: Sep. 97; Demonstrate prototype software: Dec 99, Demonstrate version I software: Sep 00, Demonstrate final system: Mar 02.

3. DTLOMS Area.

a. Primary: Materiel.

b. Secondary: None.

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Digitization.

5. CSS BOS Function.

a. Primary: Arm.

b. Secondary: Distribute.  
Distribution of CL V supplies.

6. FXXI Priority. High.  
High within the CASCOM (DCD-Ord Dir) and within the US Navy.

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. None.

[MSS was not listed in this Plan.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed.

9. The 1996 US Army Modernization Plan. Not Reviewed.

10. Prerequisite(s).

a. FXXI E/Is. None.

b. Other prerequisites. None.  
But the MSS will need to run on some available computer (Windows NT capable).

11. Overall risk status of

a. Prerequisite E/Is. N/A.

b. Other prerequisites. N/A.

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. N/A.

b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? None.

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? None.

16. Supporting analytical studies. N/A.

[SME indicated that performance of any supporting studies is not applicable.]

17. Changes in manpower requirements caused by fielding this given CSS E/I. None.

18. Related changes in CSS efficiency. Increase.

MSS will permit faster access to more complete ammunition safety and technical information. It will allow the 55B to recommend accurate/safe quantity-distance ratios while reducing the ASP/ATP footprint. Munitions survivability software is required to help soldiers understand the risks and recommend an optimum storage layout. This layout would provide maximum survivability and efficiency while reducing the ammunition storage area footprint. This software can also improve peacetime training and pre-deployment planning.

19. Related changes in CSS effectiveness. Increase.

[Refer to the above paragraph.]

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself). None.

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Not Developed.

Too early.

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. N/A.

No MNS is required.

b. ORD. N/A.

No ORD is required.

c. BOIP. No.

Too early, but plans call for one MSS per Modular Ammunition Company Platoon. Total MSS requirement is estimated at 68 copies for all four FPs.

23. CSS E/I training in TRADOC schools. No.

24. Examined in

a. TF XXI AWE (Mar 97). No.

b. TRAC's Div Design Analysis Study: No.

c. The Nov 97 DAWE. No.

25. Tested elsewhere. No.

We do not yet have any programming requirements.

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. No. PROGRAM FUNDING: RDTE 6.6 unfunded. FY98-03/EPP: unfunded.

27. Planned BOIP (connectivity between FPs). Yes.  
Tentative plans call for fielding the MSS to each modular ammunition Platoon.

28. Technical capabilities. Unproven.  
No current automated procedures exist today to lay out an ASP/ATP.

[However, the MSS will consist of state-of-the-art software which is COTS technology and proven in the commercial world.]

29. LIA's 15 elements of ILS assessment. N/A.

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). Unknown.

b. In time for the First Digitized Corps (2006). Unknown.

c. During FY 07-10. Unknown.

31. Overall Peacetime (Programmatic) risk. Amber.  
Lack of developed specifications (computer programming), lack of funds, and lack of a developed concept.

[Both the SME and this study team would have rated MSS as "Red" except for the fact that the technology (Windows NT-based software) exists now and is a proven COTS item.]

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.

33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation. N/A.

34. Wartime backup (BU) system. Only BU system would be the current manual procedures taught in service schools and which rely on FM and TM. The planned MSS will be designed as an aid to assist in laying out ammunition storage areas. MSS will not be designed to circumvent or replace information currently in FM/TM. These manuals will continue to be fielded for use in laying out such storage areas.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. N/A.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. Medium.  
Without MSS the use of a manual BU system will take longer to layout and manage an ASP/ATP. This risk could even become worse if service schools ever stopped teaching the manual process and completely relied on the automated software.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Medium.  
Units not receiving this software would operate less efficiently.
38. Other adverse wartime impacts (e.g., scenario dependent). None.
39. Overall wartime risk associated with employment of this CSS E/I. Green.
40. Overall risk (considering both programmatic and wartime risks). Amber.  
Lack of developed specifications (computer programming), lack of funds, and lack of a developed concept.
41. Ordinal ranking of this CSS E/I by the CSS DCDs.
42. Cardinal ranking of this CSS E/I by the CSS DCDs.
43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities. N/A.
44. Remarks. None.
45. Data Sources. MAJ VonDorn, CASCOM (DCD-Ord Dir), DSN: 687-0251.



1. Title. PLS DISCOM XXI- Fielding PLS to the Force XXI DISCOM TMT Company

2. Designation. FXXI CSS Initiative.

a. The following PLS description is taken from draft input to the May 97 CASCOM CSSMMP.

(1) The PLS consists of a truck, trailer and demountable flatracks carried on the truck and trailer. System is capable of loading/unloading itself and companion trailer in 5 minutes through a load handling system integral to the truck.

(2) PLS Characteristics. The PLS is a key distribution platform in Transportation, Field Artillery, and Ordnance units.

16.5 tons each for truck/trailer  
clears 4 meter underpass

50 mph maximum speed

5 speed automatic  
transmission

48 inch fording capability  
225 mile range (@ Gross Vehicle  
Weight (GVW)  
steerable rear axle  
DVE

C-141 air transportable  
Central Tire Inflation System (CTIS)

5 axle drive  
MTS

b. The following description of the PLS-DISCOM XXI initiative was provided by the CASCOM SME.

(1) PLS to the TMT Company in the Heavy Division. These systems will replace the current vehicles in the Medium Truck Platoon: 33 each 5 ton Tractor (M931) and 66 each Trailers, 22.5 ton break-bulk stake and platform (M871). An increase in unit effectiveness and capabilities is expected. Personnel level will remain at 252 for the TMT. Each PLS will consist of a PLS Tractor, trailer and four (4) flatracks.

(2) Discussion.

\* Current TMT Company design includes 4 Truck Platoons:

1 Light Truck Plt (3 squads, 36 5T Cargo Trucks; 12 per squad)

1 Medium Truck Plt (3 squads, 33 5t Tractors w/66 22.5T  
trailers; 11 tractor & 22 trailer per  
squad)

2 Heavy Truck Plt (4 squads, 24 HET Tractors w/24 HET trailer;  
12 vehicles per Platoon/6 per Squad)

\* The Force XXI PLS Initiative will redesign the 4 platoons into three (3) Tactical Truck Platoons and one (1) Heavy Truck Platoon. All 4 HET squads will be consolidated into one platoon (24 HET w/ trailers; 6 HET per squad. Each of the three Tactical Truck Plt will contain 2 squads, a Light Truck Squad and a PLS Cargo Squad. The Light Truck Squads will not change from the

current TMT Company design. The three PLS Cargo Squads, with 11 PLS each, will replace the three Medium Truck Squads.

- \* Each PLS Cargo Squad will consist of 11 PLS tractors, 11 PLS trailers, 44 flatracks and 11 CHU.

- \* In the three Tactical Truck Platoons (6 squads), the one-time dry cargo lift capability increases by 346.5 STON to 1,269 STON. The three Light and three Medium Truck Squads in the current design can lift 922.5 STON of dry cargo in one movement. As added value, the 33 PLS have a higher Task Vehicle Availability Rate (TVAR) than the 33 vehicles which are being replaced.

- \* DISCOM and supported units will benefit by the availability of Division assets to move PLS flatrack cargo within the DSA and BSA. Flatrack retrieval/repositioning capability will now be available without Corps support. The PLS will also be capable of moving/transporting 20' ISO containers and shelters as the DEPMEDS and maintenance shelters.

- \* Fuel consumption, annual maintenance man-hours and unit deployment weight may change in the new design. Estimated values have not been calculated. The flatrack mix has not been identified. TOE design will follow the XXI DAWE evaluation.

### (3) Key Points.

- \* The TMT PLS vehicles comprise the only common user PLS in the Division. All other Division PLS (ATP and Division Artillery) are dedicated to the ammunition distribution mission.

- \* TAA 03 identifies six (6) Active Component Heavy Divisions, which would receive the 33 PLS. This new requirement (198 systems/\$70.6M) is not currently funded (POM 99-03). A similar shortfall exists for the National Guard, which is currently structured for seven (7) Heavy Divisions.

### 3. DTLOMS Area.

- a. Primary: Organization.

- b. Secondary: None.

### 4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Modernization.

### 5. CSS BOS Function.

- a. Primary: Distribute.

- b. Secondary: Arm, Fuel, Fix, Man, Sustainment Engineering.

Also, PLS-DISCOM XXI will, as required, support other Combat and CS BOS.

### 6. FXXI Priority. Medium.

[CASCOM SME responded that this initiative is the CASCOM DCD-Trans' #5 priority out of 7 FXXI entries.]

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. N/A.

[This initiative was not listed in this plan.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed.

9. The 1996 US Army Modernization Plan. Not Reviewed.

10. Prerequisite(s).

a. FXXI E/Is. None.

[The CASCOM SME indicated that this initiative does not "require" the MTS and DVE. However, these other initiatives (MTS/DVE) would definitely enhance the capabilities of this PLS-DISCOM XXI initiative.]

b. Other prerequisites. None.

11. Overall risk status of

a. Prerequisite E/Is. N/A.

b. Other prerequisites. N/A.

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. N/A.

b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? None.

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? Unknown.

[SME indicated "Unknown." Also, refer to both the HEMTT-LHS and CROP CEFA assessments. Although not designated as a FXXI CSS initiative/enabler, as a minimum the BD concept will "benefit" by having more PLS and CROP in the DISCOM.]

16. Supporting analytical studies. None.

17. Changes in manpower requirements caused by fielding this given CSS E/I. None.

The end strength of the TMT Company (252) would not change. However, there may be changes in skill/grade mixes.

18. Related changes in CSS efficiency. Increase.

Increased efficiency gained by ability to deliver and retrieve flatracks between customer sites. More tactical mobility than vehicles replaced. Limits the need for MHE at customer sites.

19. Related changes in CSS effectiveness. Increase.

The revised mix of tactical vehicles in the TMT Company provides an increase of 418.5 STON of cargo as a one-time lift capability. Previous TMT Company design was equal to 992.5 STON; whereas the new PLS-DISCOM XXI design is equal to 1341 STON.

[Note: in the 3 Apr 97 CASCOM FXXI briefing to the TRADOC CDR, the PLS-DISCOM XXI chart indicated "Effectiveness Increases To- Be- Determined."]

20. Related force structure (equipment and/or organizational) changes.

- a. In equipment (other than the equipment associated with the given CSS E/I itself). None.

[There will be no ancillary equipment required "in addition" to that required by this initiative. However, it should be noted that the SME reported that this initiative itself will increase overall PLS requirements. This initiative would replace 33 tractors (5-tons) and their associated 66 trailers (22 & 1/2-ton, 30 foot stake and platform) with 33 PLS vehicles ( includes trailers) and 132 associated flatracks and 33 CHU. Actual equipment densities will be worked in TOE development.]

- b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Not Developed.

Not yet developed. The CSS Annex of TRADOC Pam 525-71 is in draft, as well as a CASCOM "Concept of Support."

22. Approved documentation (e.g., MNS, ORD, BOIP).

- a. MNS. N/A.

This is a concept of operations change; therefore, it does not require a MNS or ORD. If use of PLS by the TMT is validated in the DAWE (Nov 97), a change to the PLS BOIP and the TMT would be put in the FDU (98-2).

- b. ORD. N/A.

- c. BOIP. No.

Not yet. The PLS BOIP would be updated with new allocation for the TMT Company.

23. CSS E/I training in TRADOC schools. No.

PLS for non-MOADS applications is not being trained in TRADOC schools. However, such is being trained in units. Appropriate Training Support Packages are in Training Circular 21-305-10. TTPs are to be developed by CASCOT Training Directorate as part of the upcoming DAWE (Nov 97).

24. Examined in

a. TF XXI AWE (Mar 97). Yes.

[This concept of having additional PLS in the TMT Company for non-MOADS use (an organizational-like change) was not tested during TF XXI. However, the CASCOT SME indicated that the use of PLS trucks to haul non-ammunition loads was proven during the TF XXI. The CASCOT SME did not provide this assessment with any information to support the "was proven" aspect of TF XXI PLS use.]

b. TRAC's Div Design Analysis Study. No.

c. The Nov 97 DAWE. Yes.

25. Tested elsewhere. Yes.

PLS is a proven capability for transporting ammunition and has been used successfully in support of moving other commodities and unit equipment for OJE and other deployments.

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. No.

Additional funds are needed to procure the needed 33 PLS for each (Heavy) Division. TAA 03 baseline would place total requirements at 198 new systems (33 x 6 Heavy Divisions) beyond current procurement objective (\$62.8M).

27. Planned BOIP (connectivity between FP). Yes.

Planned BOIP is 33 PLS, 132 flatracks, 33 CHU per each FXXI Heavy Division TMT Company. Truck LIN is T41067 or T40999. Trailer LIN is T93761. Flatrack LIN TBD based on mix of A-frame (M1077), M1/ISO compatible or M2 variant.

28. Technical capabilities. Proven.

PLS technical capabilities include the hauling of 16.5 STON in each lift; 48" fording capability; 225 mile range @GVW; steerable rear axle; 5-speed automatic transmission; 5 axle drive; includes capabilities of employing the MTS/appliqué and DVE. These capabilities have been proven by the fielding of PLS to support ammunition (MOADS) concept and by the use of PLS in OJE.

[This study team notes that this unique PLS-DISCOM XXI initiative as defined by the CASCOT SME does not require the use of MTS and DVE, as neither of these FXXI initiatives was indicated by the SME in paragraph 21a above as "prerequisites" for this PLS-DISCOM XXI initiative itself.]

29. LIA's 15 elements of ILS assessment. Unknown.

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). Unknown.  
Based on availability of funds.

b. In time for the First Digitized Corps (2006). Unknown.

c. During FY 07-10. Unknown.

31. Overall Peacetime (Programmatic) risk. Amber.  
Lack of funds.

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.

(a) Threat: PLS will be employed in the Division Area/Brigade Support Area and may be subject to enemy action.

(b) RAM failure: Limited ("Low" likelihood). PLS is a proven capability.

33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation. N/A.

[This initiative does not require any other FXXI enabler/initiative (e.g., MTS, Appliqué, DVE.)]

34. Wartime backup (BU) system. A wartime BU system for the PLS-DISCOM initiative would be the use of Corps PLS or other Divisional PLS. In the worst case, anything that could be used to transport supplies and materiel could be used.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available.  
N/A.

[There likely would always be available some form of BU system as described above.]

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. Medium. Such would eliminate the TMT capability to deliver/retrieve flatrack-mounted cargo in the Division area. This in turn would then place a higher dependency on Corps PLS units to perform this mission and would limit the DISCOM's own flexibility. Use of any BU system would have to be coordinated with the owning unit(s). Without the use of flatracks, transshipment times would increase.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Low.  
Limited impact. Each TMT operates independently in support of a specific Division. The primary concern would be that some DISCOM would have no PLS capability unless provided by Corps backup support.

38. Other adverse wartime impacts (e.g., scenario dependent). Low.  
Road infrastructure in certain areas while doing Support Operations (formerly called Operations Other Than War (OOTW)) may not facilitate the use of PLS. Otherwise no other adverse impact.

39. Overall wartime risk associated with employment of this CSS E/I. Green.

40. Overall risk (considering both programmatic and wartime risks). Amber.  
Lack of funds.

41. Ordinal ranking of this CSS E/I by the CSS DCD.

42. Cardinal ranking of this CSS E/I by the CSS DCD.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSSMMP priorities. N/A.

[This initiative was not listed in this plan.]

44. Remarks. None

45. Data Sources. Mr. Tom Snodgrass, CASCOM (DCD-Trans Dir), DSN: 687- 2479.

1. Title. Petroleum Quality Analysis System--PQAS.

2. Designation. FXXI CSS Initiative.

a. Description: The Petroleum Quality Analysis System will include modern analytical instrumentation and communication equipment mounted on a highly mobile platform. PQAS capabilities include performing rapid analysis and quality testing of mobility fuels from the COMMZ to areas forward of the FSB.

b. Characteristics: A highly mobile system capable of providing fuel quality testing.

- Modern analytical instruments containing computer
- HMMWV or similar platform
- Operated by two soldiers
- Capable of communications
- Equipped for independent operations

c. Requirements/Need/Mission: PQAS will enhance a maneuver unit's capability to maintain momentum and maneuver freedom with fuels from a multitude of sources including friendly and unfriendly. Use of emerging fuel testing technologies, data processing, voice and data communications will enable the PQAS to respond to a unit's fuel testing needs in minutes rather than hours or days. The use of advanced technology may result in a reduction of personnel required to perform the mission. Replaces current air mobile laboratory (LIN L33184) which takes approximately 6 hours to process fuel samples and is operated by three soldiers. As technology progresses, a PQAS follow-on should replace the mobile laboratory (LIN L33800).

3. DTLOMS Area.

a. Primary: Materiel

b. Secondary: None.

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Both PQAS will use Near-Infra-Red technology to test fuel.

5. CSS BOS Function.

a. Primary: Fuel.

b. Secondary: Arm, Fix, Man, Distribute, Sustainment Engineering.

6. FXXI Priority. Medium.

[Based on SME's own priority.]



7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. Medium.

[PQAS was prioritized # 30 out of 51 overall items. Also, PQAS was prioritized # 13 out of 24 Quartermaster items.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed

9. The 1996 US Army Modernization Plan. Not Reviewed.

10. Prerequisite(s).

a. FXXI E/Is. None.

b. Other prerequisites. None.

11. Overall risk status of

a. Prerequisite E/Is. N/A.

b. Other prerequisites. N/A.

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. N/A.

b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? None.

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? None.

16. Supporting analytical studies. None.

None required.

[SME cited the HQ TRADOC 201644Z May 93 message which indicates that unless otherwise directed COEAs would not be performed for ACAT III/IV systems. PQAS falls in this category.]

17. Changes in manpower requirements caused by fielding this given CSS E/I. Unknown.  
Manpower requirements per system may decrease. However, the total number of systems may increase to reduce fuel testing response time and allow the positioning of PQAS closer to the user.

18. Related changes in CSS efficiency. Increase.

PQAS will test to the same basecase standards. However, PQAS will reduce the time to process fuel samples.

19. Related changes in CSS effectiveness. Increase.

The PQAS will increase the amount of tested fuel. This in turn will increase weapon system availability rates. Also, the basecase testing system is in a 20' ISO shelter and requires a prime mover for relocation. The PQAS will have a dedicated HMMWV to keep up with maneuver units.

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself). None.

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Developed.

The PQAS has an approved Organization & Operation (O&O) plan (now called a MNS).

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. Yes.

Approved Oct 93.

b. ORD. Yes.

Approved 14 Jul 94

c. BOIP. Yes.

The BOIP for the PQAS is complete and is part of the objective TOE. The PQAS will replace the air mobile laboratory (LIN L33184) on a 1:1 ratio. Estimated TOE requirement is 17 systems for active and reserve divisions.

23. CSS E/I training in TRADOC schools. No.

Not yet as the PQAS is still in Research & Development.

24. Examined in

a. TF XXI AWE (Mar 97). No.

b. TRAC's Div Design Analysis Study. No.

c. The Nov 97 DAWE. No.

25. Tested elsewhere. No.

Not yet. PQAS will be tested at Aberdeen Proving Grounds, MD. after contractor testing during the Summer-Fall 97.

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. No.

A funding "proposal" includes: \$6.6M for FY 00 and \$2.2M for FY 01. However, this proposal is not sufficient for total Research & Development funding requirements.

27. Planned BOIP (connectivity between FP). Yes.

Plans call for fielding the PQAS as a replacement for all the air mobile laboratories (LIN L33184) on a 1:1 ratio. Estimated TOE requirement is 17 systems for active and reserve divisions.

28. Technical capabilities. Unproven.

Technical capabilities include the ability to conduct required fuel testing in reduced time frames IAW American Society for Testing and Materials (ASTM) standards. Even though PQAS consists of COTS technology, the civilian sector does not use this technology in the same way that the Army will. Also, the civilian sector does not use this technology up to the same rigorous standards that the Army requires. Research & Development technical testing has occurred with capabilities proven for some applications. However, technical capabilities are still unproven.

29. LIA's 15 elements of ILS assessment. Assessed.

[This study team was able to determine that OPTEC did conduct an ILS review for the PQAS. However, limited study time precluded any further attempts to acquire their assessment.]

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). No.

{SME responded that a contract will be awarded in FY 00 to start production. Fielding may start in FY 02.]

b. In time for the First Digitized Corps (2006). Yes.  
Likely.

c. During FY 07-10. Yes.  
Likely.

31. Overall Peacetime (Programmatic) risk. Amber.

[SME assigned an "Amber" due to lack of funding and unproven technical capabilities. However, this study team would have assigned a "Red" due to these reasons and due to the lack of Army field testing, except for the fact that PQAS has an approved MNS (which contains the Operational Concept), ORD and BOIP.]

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.  
Threat similar to supported unit.

[RAM for the HMMWV chassis is proven; however, no information was provided for RAM on the PQAS itself.]

33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation. N/A.

34. Wartime backup (BU) system. None planned. The PQAS will be employed forward in the Divisions, whereas the current fuel testing system is located in the Corps. Thus, there will be no real Division-level PQAS BU system other than perhaps the use of another PQAS located at a sister unit.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available.  
High.

Fuel samples would have to be sent back to EAD which would cause delays in receipt of fuel quality analyses by forward maneuver commanders.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available.  
N/A.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Medium.  
Such would impact the capacity to perform fuel analysis, resulting in longer turnaround times. However, plans call for fielding the PQAS to all divisions currently having the air mobile laboratories (LIN L33184) on a 1:1 ratio.

38. Other adverse wartime impacts (e.g., scenario dependent). None.

39. Overall wartime risk associated with employment of this CSS E/I. Amber.  
Due to lack of planned division-level BU system. If the threat destroys a PQAS, then there would be longer turnaround times for acquiring results of fuel testing.

40. Overall risk (considering both programmatic and wartime risks). Amber.

[SME responded "Amber to Green." However, this study team elected to assign an "Amber."]

41. Ordinal ranking of this CSS E/I by the CSS DCD.

42. Cardinal ranking of this CSS E/I by the CSS DCD.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities.

44. Remarks. None

45. Data Sources. Mr. William Perdue, CASCOM (DCD-QM Dir), DSN: 687-0572. CASCOM Sep 96 CSSMP and related May 97 updates.

1. Title. Pocket Unit Maintenance Aid (PUMA)- A TIGER Initiative.

2. Designation. FXXI CSS Initiative.

However, PUMA may transition to enabler status by 2000.

a. Description: The technological basis of PUMA is the personal data (or digital) assistant (PDA), currently sold in the commercial market. PDAs are available in a variety of shapes and configurations and are manufactured and marketed by Apple, AT&T, Motorola, Sharp, Zenith, and others. PDAs consist of a central processing unit (CPU), a visual display, an input device (stylus, finger, button, pressure sensitive screen, voice), and an output device (cable connector, modem, transmitter).

b. Characteristics: Early PDAs did not fulfill market expectations. Most are now in their second generation. Costs are down; capabilities are up. Apple's PDA, the Newton, is already used as a diagnostics tool and maintenance aid by cable linesmen. In this particular Newton application, it diagnoses, displays technical information, maintains records, and automatically orders (through a wireless modem) correct repair parts. A few modifications were made to the basic Newton; the most visible being a heavy rubber protective covering. User-friendliness is enhanced by adding a back-lit screen that enables the Newton to display information in bright sunlight. The device fits comfortably into a knee pocket, or into a belt-supported holster. The much improved third generation Newton and PDAs from other vendors should hit the market within the next nine months.

c. Requirements/Mission: PUMA provides the mechanic with a comprehensive digital electronic maintenance assistant that diagnoses weapon systems, displays ETM and IETM, management information, and repair parts databases. Just as significant, PUMA permits the mechanic at the job site to input his work order status, parts requisitions, calls for assistance and support, and e-mail. Also, he can use PUMA as a voice communicator. Here is a brief summary describing how PUMA works:

Mechanic's information needs are loaded on server

Server is mounted in:

Maintenance vehicle

Motor pool

Communicates with PUMA over spread spectrum LAN.

Server contains the following files:

ETM and IETM

Access to Division Repair Parts Database

Specialized diagnostics routines, such as the TED system

Automated and Interactive Help Desk

Mechanic, using PDA, activates diagnostic source point

3. DTLOMS Area.

a. Primary: Materiel.

b. Secondary: Doctrine: Training.

Doctrine: Because PUMA will be the mechanic's personal maintenance aid (PMA), it will serve as the display and input device for IETM. In this capacity, PUMA will contribute to automating materiel maintenance diagnostics and repair parts requisitioning in tactical units. This will result in fundamental changes to extent logistics practices.

Training: PUMA will serve as the display and input device for DIT. This will provide electronic, exportable training directly to the individual soldier.

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Both.

PUMA has been incorporated into the amended IFTE ROC. (This amendment has not yet been approved by Headquarters TRADOC.)

5. CSS BOS Function.

a. Primary: Fix.

b. Secondary: Distribute.

PUMA directs distribution of repair parts to the user; initiates order for repair parts; ensures that repair parts are located, tracked, and delivered to the user.

6. FXXI Priority. Medium.

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. Medium.

[Was listed as #28 out of 51 total items. Was listed as #13 out of 21 Ordnance items.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed.

[Was not briefed by HQ TRADOC to ODCSOPS as a system requiring additional funds. However, TIGER was labeled as "Red" (due to lack of funds the First Division Equivalent will not receive this equipment until after FY 2006.)

9. The 1996 US Army Modernization Plan. Not Reviewed.

10. Prerequisite(s).

a. FXXI E/Is. None.

b. Other prerequisites. CS.

Communications. Must have FBCB2 capable radios on all tactical maintenance vehicles. IETM and ETM will not be loaded on the PUMA, but accessed through a server. The server will be the gateway to FBCB2. ICS3-at least initially-will be accessed through FBCB2.

11. Overall risk status of

a. Prerequisite E/Is. N/A

b. Other prerequisites. Low.

Low- for equipping all tactical maintenance vehicles with FBCB2-capable radios; Low-for diagnostic access ports on existing weapon systems and vehicles (many are equipped with bus ports (J-1708, MIL-STD-1553), STE ports, RS-232 ports, or test ports, such as that on the AGT-1500 gas turbine engine on the M1A1/A2 main battle tank. Circuits on older systems and items can usually be diagnosed through hookups at strategic points in the electrical system. BOB and automated BOB are available as an electronic interface between some diagnostic systems and the equipment to be diagnosed.

[This study team does not know the extent to which this requirement (for FBCB2-compatible radios) has been coordinated with offices responsible for development of tactical maintenance vehicles (e.g., the CMT and the FRS-H). Later in paragraph 31 below the reader will see that the PUMA SME rated the programmatic risk as "RED", citing as one reason the lack of FBCB2-compatible radios.]

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. N/A.

b. The other prerequisites. None.

However, without the PUMA they would be constrained by contemporary business-as-usual maintenance and supporting logistics practices.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function. None.

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? Specify.

[The SME responded "None." However, this study team thinks that the Multicapable Maintainer will benefit from fielding the PUMA and several other maintenance initiatives/enablers. Collectively these will help the Multicapable Maintainer to realize his/her full synergistic benefits as planned under the new FXXI maintenance concept.]

16. Supporting analytical studies. Unknown.

17. Changes in manpower requirements caused by fielding this given CSS E/I. None.  
Changes (decreases) are possible later.

18. Related changes in CSS efficiency. Increase.

PUMA is the key component for establishing off-system anticipatory maintenance of weapon systems and other items in combat, combat support, and combat service support units. PUMA's diagnostics capabilities will become the start point for VM by reducing RCT and Order Ship Time (OST). PUMA will enable the mechanic to more accurately diagnosis repairs and the order repair parts at the maintenance break-down site, as requirements are determined. The end result is a lower Not Mission Capable rate and fewer resources wasted or unused in the maintenance process.

19. Related changes in CSS effectiveness. Increase.

The acquisition and subsequent materiel development of this hardware, software, and its associated components will improve readiness in tactical units, because PUMA will provide the supporting mechanics an immediately available means to diagnose equipment (PUMA is the host for IETM and ETM, to access essential logistics information, and to automatically order the requisite repair parts (over ICS3). Having this capability will save time and focus maintenance efforts to the extent that current force structure cuts in the DISCOM should be overcome (provided there is a concomitant improvement in logistics processes).

20. Related force structure (equipment and/or organizational) changes

- a. In equipment (other than the equipment associated with the given CSS E/I itself).

Unknown.

FBCB2 compatible radios inside tactical maintenance vehicles are required for PUMA.

[This study team does not know the extent that such radios may already be planned for these vehicles, indifferent to the PUMA.]

- b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Developed.

PUMA is included in the draft TIGER concept, the final draft of which is being prepared for submission to HQ TRADOC.

22. Approved documentation (e.g., MNS, ORD, BOIP).

- a. MNS. N/A.

MNS is not required. PUMA is included in the amended IFTE ROC (not yet approved by HQ TRADOC).

- b. ORD. Unknown.

[CASCOM SME provided no response.]

- c. BOIP. No

Not yet. Draft BOIP for all four Force Packages is being prepared; it will be submitted upon project approval. BASIS OF ISSUE/TOTAL REQUIREMENT: 1 PUMA per mechanic, and one server with wireless LAN per CMT/maintenance section.



23. CSS E/I training in TRADOC schools. No.  
Not yet.

24. Examined in

a. TF XXI AWE (Mar 97). No.  
Unfunded during TF XXI preparations.

b. TRAC's Div design Analysis Study. No.

c. The Nov 97 DAWE. No.

25. Tested elsewhere. No.

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. No. Developing POM submission now (25 Jun 97).

27. Planned BOIP (connectivity between FP). Yes.  
Proposed BOIP is one PUMA PMA per maintenance soldier; one PUMA server per maintenance team vehicle, and per UM or DS activity.

28. Technical capabilities. Proven.  
PUMA leverages commercial efforts already accomplished, and the ARL TED system. Currently TED is being "miniaturized" to become PUMA for non-digital electronic engine control units (ECU) on AGT-1500 gas turbine engines. PUMA is being developed to monitor and diagnose DECU.

29. LIA's 15 elements of ILS assessment. Not Assessed.

[Too early in PUMA's development cycle.]

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). No.

b. In time for the First Digitized Corps (2006). Unknown

[SME responded "Yes. This is contingent on successful proof-of-principle and funding." However, this study team thinks that an "Unknown" is more appropriate.]

c. During FY 07-10. Unknown

[SME responded "Yes." However, this study team thinks that an "Unknown" is more appropriate.]

31. Overall Peacetime (Programmatic) risk. Red.  
Lack of funding; lack of FBCB2-capable SINCGARS radios in the CMT.

[The CASCOM SME noted the above lack of FBCB2-capable radios in the CMT.]

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.

Threat: not likely. The threat to PUMA is related to that of the host vehicle to which it is attached (CMT, FRS, M-88A1/A2, M113A1/A2). Because most-excepting the M88 and the M113-are not likely to be threatened by direct fire, PUMA is susceptible only to those dangers characteristically associated with other combat support, and combat service support vehicles.

RAM failure: unlikely. Electromagnetic Spectrum: same as FBCB2.

33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation. N/A.

34. Wartime backup (BU) system. Return to manual diagnostics and repair parts ordering. The quality of backup services will be related to the amount of training and experience possessed by the available operators, crew, and maintenance personnel. They must be competent in applying appropriate battle damage assessment and repair.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. N/A. There will likely always be at least a manual BU procedure.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. Medium. A return to manual diagnostics and repair parts ordering would degrade our maintenance capability. The quality of backup services will be related to the amount of training and experience possessed by the available operators, crew, and maintenance personnel.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Medium. Limits us to current capabilities. Units without PUMA would not benefit from its more accurate diagnostics and reporting capabilities. This in turn would affect OR rates.

38. Other adverse wartime impacts (e.g., scenario dependent). None.

39. Overall wartime risk associated with employment of this CSS E/I. Green.

40. Overall risk (considering both programmatic and wartime risks). Red. Lack of funding; lack of FBCB2-capable SINCGARS radios in the CMT.

41. Ordinal ranking of this CSS E/I by the CSS DCD.

42. Cardinal ranking of this CSS E/I by the CSS DCD.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities.

44. Remarks. None

45. Data Sources. Mr. William Kasper, CASCOM (DCD-Ord Dir), DSN: 687-0255. CASCOM Sep 96 CSSMMP and related May 97 updates.

1. Title. PORTABLE UNIT OIL LEVEL ANALYZER (PUOLA).

2. Designation. FXXI CSS Initiative.

a. Description: PULOA is a concept that will provide portable and instantaneous oil analysis supplementing or replacing present laboratory methods based on scheduled time or interval. PULOA technology, is an in-line/portable sensing unit that continually monitors oil health and will alert the maintainer to immediate contamination. PULOA data is read and analyzed using the same portable unit and has the ability to store information for down-loading to computers as necessary. PULOA performs absolute viscosity, moisture level, particle count and ferrous particle tests; analyzes results for trend analysis.

b. Benefits: PULOA puts oil analysis in the hands of the Commander. The primary advantage of PULOA over current laboratory methods is its ability to continually monitor oil health providing analysis at any time. To often components fail because of the time involved between samples or re-samples. PULOA will give us the ability to have continuous on board oil analysis allowing us the opportunity to stop using equipment as soon as a problem is indicated; reducing rebuild costs. With this increased ability, we will be able to correct component deficiencies immediately, opposed to the current method of identification using laboratory sponsored sampling.

c. Cost: PULOA will cost \$700K to test two prototype units. Estimated production cost is \$30K per unit. Estimate basis of issue is 636 units; one per Battalion and separate Company.

d. Current Status: Currently, PULOA is an unfunded program. PULOA is a FY 98 CEP candidate.

3. DTLOMS Area.

a. Primary: Materiel

b. Secondary: None.

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Modernization  
Units will be equipped with the ability to conduct oil analysis at their level, as opposed to the current laboratory method. Provides immediate status tracking and reporting.

5. CSS BOS Function.

a. Primary: Fix.

b. Secondary: Distribute  
Primarily the Sustain part of the Distribute function.

6. FXXI Priority. Low.

Based on SME-MJ. The PUOLA is in its initial stage. Testing has not yet started, but the item is fully developed NDI technology.

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. Medium.

[As part of the TIGER program, PUOLA (then named "COBOA") was prioritized # 28 out of 51 items. Also, this group of TIGER initiatives was prioritized #13 out of 21 Ordnance items.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed.

9. The 1996 US Army Modernization Plan. Not Reviewed.

10. Prerequisite(s).

a. FXXI E/Is. None  
PUOLA uses stand alone technology.

b. Other prerequisites. None.

11. Overall risk status of

a. Prerequisite E/Is. N/A.

b. Other prerequisites. N/A.

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. N/A.

b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? None.

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? None.

16. Supporting analytical studies. None  
PUOLA is still under evaluation by the US Army Logistics Support Agency (LOGSA). We expect test results by May 97.

17. Changes in manpower requirements caused by fielding this given CSS E/I. Unknown.  
PUOLA might reduce manpower requirements at the Corps level Oil Analysis Lab. However, final determination of this is subject to results of testing and fielding.

18. Related changes in CSS efficiency. Increase.  
Less hazardous oil waste, reduced time to sample oil, provides opportunity to sample more components at the same cost, and provides diagnostics for components.

19. Related changes in CSS effectiveness. Increase.  
Reduces time for the maneuver commander to obtain oil sampling results.

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself). Unknown.

[SME responded "Decrease. We can anticipate a decrease in the equipment found in the current Corps level Oil Analysis Lab." However, the SME still thought that PUOLA should be categorized as an "initiative" at this time. Therefore, in keeping with the CDR CASCOT established definitions of a FXXI enabler/initiative, this study team assumed that the overall magnitude of the decrease in equipment requirements was not yet completely known by the SME. Thus, this study team assigned an "Unknown" until this is resolved.]

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Not Developed.  
Concept for PUOLA is part of the Ordnance concept that still is under development.

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. No.  
PUOLA needs a MNS and an ORD.

b. ORD. No.

c. BOIP. No.  
BOIP estimate is 636 units; one per Battalion and separate Company.

23. CSS E/I training in TRADOC schools. No.  
Not yet.

24. Examined in

a. TF XXI AWE (Mar 97). No

b. TRAC's Div Design Analysis Study. No.

c. The Nov 97 DAWE. No.

25. Tested elsewhere. Unknown.

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. No.  
Funding requests have not yet been submitted. PUOLA still requires testing.

27. Planned BOIP (connectivity between FP). Yes.  
Plans call for one per Battalion and separate Company.

28. Technical capabilities. Proven.  
Proven in the commercial world. PUOLA will be a NDI for the Army using COTS technology.

29. LIA's 15 elements of ILS assessment. Not Assessed.

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). No.  
However, could be if PUOLA was purchased by the Army.

b. In time for the First Digitized Corps (2006). No.

c. During FY 07-10. No.

31. Overall Peacetime (Programmatic) risk. Red.  
No money, no approved MNS or ORD, lack of field testing.

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.

33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation. N/A.

34. Wartime backup (BU) system. None other than use of another unit's PUOLA.

[SME responded "None" for this question. However, this study team thinks that a unit may be able to borrow a PUOLA from an uncommitted unit that is located nearby.]

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. N/A.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. Medium.

[SME responded "Not relevant." However, once the PUOLA is fielded, plans call for elimination of the current Corps level oil analysis labs. Thus, maneuver commanders would have to rely solely on the PUOLA. If their PUOLA were damaged and they had to experience a longer waiting time to receive oil analysis results from some BU PUOLA, their options for combat may be adversely affected. Thus, this study team assigned a "Medium" response.]

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Medium.  
More oil waste, increased environmental burden, etc.

[Also, if PUOLA were only fielded to selected units, then we would have to retain some form of Corps level oil analysis lab for those units without PUOLA. This in turn would offset in some way

the PUOLA battlefield efficiencies planned for the maneuver commander. Thus, this study team assigned a "Medium" response.]

38. Other adverse wartime impacts (e.g., scenario dependent). None.

39. Overall wartime risk associated with employment of this CSS E/I. Green.

40. Overall risk (considering both programmatic and wartime risks). Red  
No MNS or ORD; no funds; needs testing.

41. Ordinal ranking of this CSS E/I by the CSS DCD.

42. Cardinal ranking of this CSS E/I by the CSS DCD.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities.

44. Remarks. None

45. Data Sources. CW3 Slaughter, CASCOM (DCD-Ord Dir), DSN: 687-0595. CASCOM Sep 96 CSSMMP and related May 97 updates.



1. Title. Radio Frequency (RF) Tags.

2. Designation. FXXI CSS Initiative.

a. Description: The RF Tag is the electronic equivalent of a bar code label. It is a combination of computer, database, controller and two-way communication device which is attached to a shipping container, air pallet or vehicles. It can then be used to provide "inside the box" visibility and support in-transit visibility.

b. Characteristics: An RF Tag is attached to the item to be shipped (container, pallet, vehicle) and contains manifest data. When the tag passes a fixed or handheld interrogator, the tag downloads its identity to the interrogator. The interrogator will then pass the data to a central database via the Transportation Resource Accounting and Phone Reporting System (TRAPR) and the Transportation Resource Accounting and Satellite Reporting System (TRASR). The TRAPR is a communications device which is placed at key transportation and supply nodes and reports the passage of tagged items to the centralized database. The TRASR consists of satellite communications, Global Positioning System receiver and a laptop computer. The TRASR is used to provide ITV data in austere environments where there are no telephones.

c. Requirement/Need/Mission: During Operation Desert Storm/Desert Shield, rapid deployment led to a backlog of thousands of containers in the surface ports and air pallets in the aerial ports of debarkation. Loss of documentation about the contents and consignees of these shipments resulted in the loss of in-transit visibility and accountability. The RF Tag and its associated equipment is one step on the way to gaining inside the box visibility, source data automation and in-transit visibility.

3. DTLOMS Area.

a. Primary: Materiel.

b. Secondary: None.

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Both.

5. CSS BOS Function.

a. Primary: Distribute.

b. Secondary: None.

6. FXXI Priority. High.

On the list of initiatives for the First Digitized Division, approved for Wartime Rapid Acquisition Program (WRAP) funding.

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. High.

[CSS C4 which contained RF Tags was prioritized as #1 out of 51 overall items. RF Tags was prioritized #5 out of 5 overall CSS C4 sub-components.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed.

[RF Tags were not included in any request for additional funding in this briefing.]

9. The 1996 US Army Modernization Plan. Reviewed.

[Page I-6 discusses RF Technology as part of the Microcircuit Technology in Logistics Applications program. "The total program is rated Green. This technology is being implemented at Contingency Corps, Europe, NTC, and several CONUS locations. Assuming present funding levels are retained, it will be fielded Army-wide FY 02."]

10. Prerequisite(s).

a. FXXI E/Is. None.

b. Other prerequisites. None.

11. Overall risk status of

a. Prerequisite E/Is. N/A.

b. Other prerequisites. N/A.

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. N/A.

b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? None.

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? Specify.  
RF technology will enhance the ICS3 system. Integration of RF technologies into the ICS3 will provide asset visibility and intransit visibility information to the SSA and to managers Army-wide. Without integration, the data generated by RF Tags will only provide information to a fraction of the people who need it.

16. Supporting analytical studies. Yes.

AAR from operations in Somolia, Haiti, Retro Eur and Bosnia. AAR are on file in CASCOM (ISD). AAR support the efficiencies gained from the use of RF Tags.

[SME considered these AAR to be similar in nature to analytical studies.]

17. Changes in manpower requirements caused by fielding this given CSS E/I. None.

18. Related changes in CSS efficiency. Increase.

Based on SME-MJ and the above cited AAR.

19. Related changes in CSS effectiveness. Increase.

Based on SME-MJ and the above cited AAR.

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself). None.

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Developed.

Concept has been approved.

[No approval data/approving authority obtained by this study team.]

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. Yes.

MNS approved 21 Nov 92.

b. ORD. Yes.

ORD approved 26 Aug 94.

c. BOIP. No.

Not yet developed.

[In the May 97draft submission to the CASCOM CSSMMP, the following information was reported "...The BOIP is still being defined for RF peripheral devices. Our goal is to incorporate the RF equipment into the hardware configurations of selected STAMIS. RF Technology is in place at selected CONUS and European locations in support of the Battlefield Distribution Demonstration (started April 95) and to support Operation Joint Endeavor." Also, the SME reported that the BOIP is under development, with feeder data completed.]

23. CSS E/I training in TRADOC schools. No.

No training yet in TRADOC schools. However, contractors are training soldiers on this technology at locations where RF Tags are being tested.

24. Examined in

a. TF XXI AWE (Mar 97). Yes.

[a. CASCOM's TF XXI emerging results briefing to Congressman Sisisky on/about 14 Apr 97 indicated that "... CSSCS and RF Tags showed potential."

b. CDR CASCOM's 23 Apr 97 TF XXI AWE briefing to the C&GSC indicated that RF Tags were an examined CSS initiative. Charts read "...RF Tags. Insights. Improved asset visibility. Attention must be given to development of control procedures for use of AIT technology.... RF Technology- the only candidate approved for WRAP funding at the 14 Apr 97 EWG."

c. CASCOM's 9 Jun 97 TF XXI AWE briefing to BG Dayan (Israeli Army) indicated that "RF Tags. Insights. Concept has proven itself in Somalia/Haiti. Error resulted in less than 25% of tags monitored arriving on Ft Irwin-vehicles bypassed fixed interrogator sites. 96% success rate was achieved upon deployment. Coordination for location of fixed interrogator sites is critical- considered a training issue. OPTEC gave the initiative (RF Tags) a "P" rating for great potential during final briefing at AWE... 151 vehicles were tagged at Ft Hood. Two fixed interrogators were established at Ft Irwin (Main Gate and Dustbowl). Very limited use in the box."

d. TRAC-LEE's May 97 Emerging Results briefing (for the CSS analysis) indicated that "...RF Tags. Experiment results disappointing on transit to NTC-only 25% RF Tags read upon arrival at NTC. NOT a problem with the RF technology, soldiers failed to follow proper procedures. User errors show need for development of control procedures for use of RF technology."]

b. TRAC's Div Design Analysis Study. No.

c. The Nov 97 DAWE. No.

25. Tested elsewhere. Yes.

AAR from operations in Somalia, Haiti, Retro Eur and Bosnia.  
AAR are on file in CASCOM (ISD).

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. Yes.

[SME indicated "Yes, as part of AIT funding MDP Code FL8h" to above funding question, but no specific funding data was provided this study team by CASCOM.]

Further, in the May 97 draft submission to the CASCOM CSSMMP, the following info was reported: "Program Funding: Procurement items are funded under MDEP FPTA 01; SSN BD7000."]

27. Planned BOIP (connectivity between FP). Yes.

[Plans call for fielding RF Tags to all four FP.]

28. Technical capabilities. Proven.

[Based on SME-MJ and the AAR cited above.]

29. LIA's 15 elements of ILS assessment. Unknown.

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). Yes.

b. In time for the First Digitized Corps (2006). Yes.

c. During FY 07-10. Yes.

31. Overall Peacetime (Programmatic) risk. Green  
Funding is sufficient for at least FP 1.

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.  
RF Tags are susceptible to jamming interference and interception.

33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation. N/A.

34. Wartime backup (BU) system. BU system would consist of manual input of data. Although not preferred, RF Tags can stand alone.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. N/A.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available.  
Low.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Low.

[Those procedures in use today which do not employ RF technology would continue to be used by units not having RF Tags. Their intransit asset visibility would be degraded, resulting in less efficiencies/effectiveness and requiring increases in labor intensive tracking procedures.]

38. Other adverse wartime impacts (e.g., scenario dependent). None.

39. Overall wartime risk associated with employment of this CSS E/I. Green.  
This critical CSS initiative supports commanders' decision making processes.

40. Overall risk (considering both programmatic and wartime risks). Green.

41. Ordinal ranking of this CSS E/I by the CSS DCD.

42. Cardinal ranking of this CSS E/I by the CSS DCD.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities.

44. Remarks. None

45. Data Sources. MAJ Jim Porter, CASCOM (DCD-ISD), DSN: 687-1929. Draft May 97 RF Tags Fact Sheet input to the CASCOM 1997 CSSMMP.

1. Title. Remote Controlled Reconnaissance Monitor (RECORM).

2. Designation. FXXI CSS Initiative.

a. Description: The RECORM is a small, two-man portable, lightweight (110 lbs.), tele-operated system. EOD soldiers will use this system in reconnaissance and monitoring of explosive ordnance disposal operations involving UXO, and all types of IED.

b. Characteristics: RECORM can be controlled from a safe distance up to 650 meters by radio frequency or fiber optic link. The mobile platform is equipped with a closed circuit television camera, and has an installed capability to use radiological and chemical monitors. RECORM has the ability to video tape the reconnaissance of routes to and around hazard areas and identify the hazards. A video tape of the render safe procedure can be recorded in real time to provide a historical record of the event. The RECORM is capable of operating under battlefield conditions.

c. Requirement/Need/Mission: RECORM grew out of a need to give the EOD soldier the capability to conduct a complete initial site survey of hazardous areas, conduct chemical and radiological monitoring, and determine the condition of UXOs and IEDs. RECORM is replacing the current capability of human investigation in the hazard area.

d. Milestones: MS III decision 4th QTR 98.

3. DTLOMS Area.

a. Primary: Materiel.

b. Secondary: None.

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Both.

5. CSS BOS Function.

a. Primary: Arm.

b. Secondary: Fuel, Fix, Man, Distribute, Sustainment Engineering.  
RECORM also supports Combat, CS and CSS mobility and survivability BOS functions.

6. FXXI Priority. Low.

Low within the CASCOM (DCD-Ord Dir) and within the US Navy.

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. Low.

[RECORM was prioritized #46 out of 51 items (as part of the EOD Robotics program). Also, RECORM was prioritized #17 out of 21 Ordnance items.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed.

9. The 1996 US Army Modernization Plan. Not Reviewed.

[However, RECORM was in CASCOR's input to this Plan. The EOD family was rated "Red" due to lack of funds.]

10. Prerequisite(s).

a. FXXI E/Is. None.

b. Other prerequisites. None.

11. Overall risk status of

a. Prerequisite E/Is. N/A.

b. Other prerequisites. N/A.

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. N/A.

b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? None.

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? None.

16. Supporting analytical studies. Unknown.

[SME was uncertain if a COEA type analysis was ever performed for the RECORM.]

17. Changes in manpower requirements caused by fielding this given CSS E/I. None.

18. Related changes in CSS efficiency. Increase.

Increased safeties and permits remote operations. This is supported by test results from DT I and OT I tests in 1994 and a DT II (1995) test. Test results are on file in CASCOR. Also, there was an independent evaluation performed by the US Navy Sea Systems Command.

19. Related changes in CSS effectiveness. Increase.

RECORM will allow us to access items of ordnance that are too dangerous to approach in person.



20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself). None.

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Developed.

Concept is approved and published as doctrine in FM 9-15.

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. Yes.

MNS #043-85-93 for EOD approved by a Joint Service EOD Program Board.

b. ORD. Yes.

ORD USN 03XA-18, 14 Apr 87, approved by a Joint Service EOD Program Board.

c. BOIP. Yes.

BASIS OF ISSUE/TOTAL REQUIREMENT: Two per EOD Company. Estimated TOE requirement is 90 systems. The quantity for Force Package I is 54. Quantity for FP II is 36.

23. CSS E/I training in TRADOC schools. No.

24. Examined in

a. TF XXI AWE (Mar 97). No.

b. TRAC's Div Design Analysis Study. No.

c. The Nov 97 DAWE. No.

25. Tested elsewhere. Yes.

Tested at the Naval Technical Division, Indian Head, MD.

[Also, refer to paragraph 18 above.]

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. Yes.

US Navy is only providing RDT&E funds. The Army has FY 02 and FY 03 OPA funds sufficient to field RECORM to all EOD units. FY 02: \$1788K for 12 systems; FY 03: \$1937K for 13 systems; FY 04: \$ 1937K for 13 systems; FY 05: \$1937K for 13 systems. Totals 51 systems.

27. Planned BOIP (connectivity between FP). Yes.

Plans call for fielding RECORM to all EOD FP 1 and 2 units.

[Note that this total quantity of 51 does not jibe with information contained in the CASCOR May 97 update to the CSSMMP-refer to paragraph 22c above. This needs resolution by the SME.]

28. Technical capabilities. Proven.

[Refer to paragraph 18 above for discussion of RECORM tests.]

29. LIA's 15 elements of ILS assessment. Unknown.

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). No.

[SME responded "No." Based on information in paragraph 26 above concerning funding for FY 02-03, this study team assumes that RECORM will not be fielded to Corps EOD units in time (by Sep 2000) "to support" the First Digitized Division.]

b. In time for the First Digitized Corps (2006). Yes.  
EOD units are Corps-level assets.

c. During FY 07-10. Yes.

31. Overall Peacetime (Programmatic) risk. Amber.

There has been a delay in procurement. This has allowed technology to surpass demonstrated capabilities. Therefore, we will have to perform engineering changes in order to upgrade the existing (model 386) onboard RECORM computer.

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.  
RECORM is modified COTS technology.

33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation. N/A.

34. Wartime backup (BU) system. No BU system other than an EOD technician with body armor.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. N/A

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. High.  
It will take longer to de-arm. There will be risk to a person in a body suit, but the mission will be accomplished.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Medium.  
Decreased ability for EOD to remotely identify UXO items and IED. The EOD mission includes bomb disposal support to the mobilization base, the US land mass, counter-terrorism, and Presidential protection. Fielding RECORM only to those units in FP 1 would seriously degrade remaining units' ability to provide this support.

38. Other adverse wartime impacts (e.g., scenario dependent). None.

39. Overall wartime risk associated with employment of this CSS E/I. Green.

40. Overall risk (considering both programmatic and wartime risks). Amber.

[Refer to paragraph 31 above.]

41. Ordinal ranking of this CSS E/I by the CSS DCD.

42. Cardinal ranking of this CSS E/I by the CSS DCD.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities.

44. Remarks. None.

45. Data Sources. MSG Frey, CASCOM (DCD-Ord Dir), DSN: 687-0566. CASCOM Sep 97 CSSMMP and related May 97 updates.

1. Title. Remote Ordnance Neutralization System (RONS).

2. Designation. FXXI CSS Initiative.

a. Description: The RONS is a battlefield capable robotics system that will perform EOD render safe procedures on UXO and IED. RONS will safely separate the EOD operator from hazardous incident sites where explosives, chemicals, and radiation hazards are present. RONS will be achieved by a major upgrade to the current RCT.

. Characteristics: RONS consists of a remote controlled platform which includes a highly dexterous robotic arm and end effector that is interfaced through a radio frequency or fiber optic communications link to an operator control station. The robotic arm provides real time manipulation functions in unstructured environments. The communications link provides an audio, video, and data interface of 650 meters between the RONS vehicle and the operator control station.

c. Requirement/Need/Mission: Its mission is to provide EOD personnel the means to secure UXO, attach a render safe tool, withdraw up to 650m to a safe area, then function the tool and neutralize the hazard. RONS will be able to perform render safe procedures on unexploded ordnance under battlefield conditions as well as defeat improvised explosive devices. RONS is an upgrade package applied to the currently fielded RCT.

d. Milestones: Successfully passed MS-II Dec 96. MS III Decision 2nd QTR 99.

3. DTLOMS Area.

a. Primary: Materiel

b. Secondary: None.

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Modernization.

5. CSS BOS Function.

a. Primary: Arm.

b. Secondary: None.

But the RONS will directly support Combat and CS BOS functions relating to Mobility and Survivability.

6. FXXI Priority. High.

Per the 1 May 97 Ordnance Vision for FXXI.

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. Low.

[RONS was prioritized # 46 out of 51 items. Also, RONS was prioritized # 17 out of 21 Ordnance items.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed.

9. The 1996 US Army Modernization Plan. Not Reviewed.

However, RONS was in CASCOM's Aug 96 input to the planned 1997 Army Modernization Plan (the EOD portion of the Logistics Annex).

10. Prerequisite(s).

a. FXXI E/Is. None.

b. Other prerequisites. None.

11. Overall risk status of

a. Prerequisite E/Is. N/A.

b. Other prerequisites. N/A.

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. N/A.

b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? None.

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? None.

16. Supporting analytical studies. Yes.

There was an 1996 Joint service (Army, Navy, USMC and USAF) AOA which was approved by the Joint Service EOD Program Board.

17. Changes in manpower requirements caused by fielding this given CSS E/I. None.

18. Related changes in CSS efficiency. Increase.

Increased safeties and remote operations.

19. Related changes in CSS effectiveness. Increase.

RONS will allow us to access items of ordnance that are too dangerous to approach in person.

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I Itself.) Increase.

RONS will require one dedicated HMMWV trailer for battlefield displacement.

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Developed  
Concept is approved and written as doctrine in FM 9-15.

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. Yes.

MNS M043-85-93 for EOD. Approval date unknown.

b. ORD. Yes.

ORD USN 447-85-96 approved late 1995.

c. BOIP. No.

Not yet. But plans call for the BOIP/TOTAL REQUIREMENT to be: One per EOD Company.  
Estimated TOE requirement is 45 systems. The quantity for Force Package I is 27; FP II/IV is 18.

23. CSS E/I training in TRADOC schools. No.

But training is underway on the precursor to the RONS in both TRADOC and Joint Service schools.

24. Examined in

a. TF XXI AWE (Mar 97). No.

b. TRAC's Div Design Analysis Study. No.

c. The Nov 97 DAWE. No.

25. Tested elsewhere. Yes.

At the Navy EOD Technical Center, Indian Head, MD. No test results available.

Also, the RONS passed DT and OT I in Nov 96.

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. Yes.

USN RDT&E: FY97-\$838K, FY 98-\$1485K, FY 99-\$915K. Procurement (US Army): FY 99-\$2082K, FY 00-\$2082K, FY 01-\$92K, FY 02-\$100K. This is sufficient funding to field RONS one per each EOD company in the force.

27. Planned BOIP (connectivity between FP). Yes.

Plans call for fielding one (1) RONS to each EOD company in FP 1 and 2 (45 systems). There are no EOD companies in FP 3 and 4.

28. Technical capabilities. Proven.

Proven in OT I in Nov 96. No test results were available.

29. LIA's 15 elements of ILS assessment. Unknown.

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). Yes.

[SME responded "Yes." Therefore, this study team assumed that RONS will be available to Corps EOD units by FY 2000 in time "to support" the First Digitized Division.]

b. In time for the First Digitized Corps (2006). Yes.

c. During FY 07-10. N/A.

31. Overall Peacetime (Programmatic) risk. Amber

EOD has a peacetime mission equal to the wartime mission for bomb disposal. Amber is assigned because the funding profile (planned fielding schedule) extends out for too long of a time period out to FY 00. This leaves many FP 1 and 2 EOD companies at unnecessary risk to perform their peacetime bomb disposal mission.

[SME assigned an "Amber" even though RONS (per paragraph 2d above) successfully passed MS II in Dec 96. Also, this study team does not know if programmed funds will cover the increases in equipment requirements associated with fielding RONS (refer to paragraph 20a above).]

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.

RONS is modified COTS technology.

33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation. N/A.

34. Wartime backup (BU) system. The planned BU system is an EOD soldier with body armor.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. N/A.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. Medium.

[SME responded "Low." However, if the RONS were not available, then more EOD soldiers will have to be exposed to this risk of personally disarming the unexploded ordnance. Also, this would decrease the capability for EOD units to respond to unexploded ordnance that threatens the maneuver commander's combat power and lines of communication. Therefore, this study team thinks that a response of "Medium" is more appropriate.]

37. Adverse wartime impacts due to limited fielding of this given CSS E/I.

High.

Decreased ability for EOD to safely clear areas contaminated with unexploded ordnance items and improvised explosive devices. The EOD mission includes bomb disposal support to mobilization base, the US land mass, counter-terrorism and Presidential protection. Fielding to only those units in FP 1 will seriously degrade the remaining units' ability to provide this support.

38. Other adverse wartime impacts (e.g., scenario dependent). None.

39. Overall wartime risk associated with employment of this CSS E/I. Amber.  
It is not cost effective to make the RONS chemically or EMP hardened. Therefore, some risk will always remain. "Amber" is assigned due to the serious consequences of failure.

40. Overall risk (considering both programmatic and wartime risks). Amber  
Peacetime risk for the extended fielding schedule, and the ever present wartime risk associated with the nature of the business of disposing of bombs.

41. Ordinal ranking of this CSS E/I by the CSS DCD.

42. Cardinal ranking of this CSS E/I by the CSS DCD.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities.

44. Remarks. None.

45. Data Sources. MSG Frey, CASCOM (DCD-Ord Dir), DSN: 687-0566. CASCOM Sep 96 CSSMMP and related May 97 updates.



1. Title. Reverse Osmosis Water Purification Unit (ROWPU)- 1,500 Gallons Per Hour (GPH)

2. Designation. FXXI CSS Enabler.

a. Description. The 1,500 GPH ROWPU is the next generation ROWPU that replaces the existing 600-GPH ROWPU. This is a Joint Program with the U.S. Marine Corps.

b. Characteristics. The 1,500-GPH ROWPU is a state-of-the-art water purification system:

- Produces 1,500 GPH on fresh water and 1,200 GPH on salt water.
- Capable of treating water during cold weather operations.
- Configured for truck-, trailer- and skid-mounting.
- NBC Survivable.
- Purifies a salt water source with total dissolved solids levels up to 45,000 milligrams per liter.
- Weight and cube will be approximately the same as the 600-GPH ROWPU.

c. Requirements/Need/Mission. The Army requires the capability to provide a safe, reliable supply of drinking water during military operations and operations other than war. The existing 600-GPH ROWPU has reached the end of its useful life, cannot operate in cold weather, corrodes easily during operations adjacent to salt water sources, and is not capable of providing acceptable quantities of potable water from sea water with extremely high total dissolved solids (up to 60,000 mg/L) levels. Each 1,500-GPH ROWPU replaces two 600-GPH ROWPUs within the division. As a result, each water point requires one less operator (reduced from 4 to 3 personnel). The 1,500-GPH ROWPU will be issued to water support units and prepositioned afloat for operational projects.

d. Milestones. FUE FY01.

3. DTLOMS Area.

a. Primary: Materiel.

b. Secondary: None.

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Modernization.

5. CSS BOS Function.

a. Primary: Man.

b. Secondary: None.

6. FXXI Priority. Unknown.

[SME did not know of any FXXI priority for the ROWPU.]

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. Medium.

[The ROWPU was prioritized #25 out of 51 items. Also, it was prioritized #10 out of 24 Quartermaster items.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed.

9. The 1996 US Army Modernization Plan. Reviewed.

[The Sustain The Force Section (Water Modernization) of this plan, page I-12 discussed the 1500 gallon ROWPU. It indicated that "...the 600 gallons per hour reverse osmosis water purification units are approaching the end of their life expectancy and do not have capability to operate in cold environments or with sources of high salinity. They are scheduled to be replaced with a 1500 gallons per hour system on a one-for-two basis, reducing equipment and operator requirements while enhancing water purification capabilities for division and brigade units....The assessment for this program (Water Modernization) for near-, mid-, and far-terms (FY 96-11) is "Amber." Water production and distribution equipment does not meet the total support and sustainment requirement.]

10. Prerequisite(s).

a. FXXI E/Is. None.

b. Other prerequisites. None.

11. Overall risk status of

a. Prerequisite E/Is. N/A.

b. Other prerequisites. N/A.

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. N/A.

b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? None.

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? None.

16. Supporting analytical studies. N/A.

COEA waived by HQ TRADOC due to urgent need for this equipment.

17. Changes in manpower requirements caused by fielding this given CSS E/I. Decrease.  
Water point personnel in a division will decrease from 4 to 3 per ROWPU.

18. Related changes in CSS efficiency. Increase.

[Refer to paragraph 2c above.]

19. Related changes in CSS effectiveness. Increase.

[As briefed to CDR TRADOC on 3 Apr 97, there will be a 30% increase in effectiveness over the present system.]

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself). None.

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Developed.

Concept is approved and part of TRADOC Pam 525-32 "Operational Concept for Potable Water Support."

22. Approved documentation (e.g.: MNS, ORD, BOIP).

a. MNS. Yes.

Approved Oct 93.

b. ORD. Yes.

Approved Aug 95.

c. BOIP. No.

BOIP feeder data is being worked. Basis of issue/Total Requirement: Five per division. Estimated TOE requirement for water production is 160 (Force Package I: 60, Force Package II: 32, Force Package III: 53, Force Package IV: 5); USAQMC&S: 6, USAOC&S: 3, AMEDDC&S: 1. Current 600-GPH ROWPU BOIP No. is Q003-AA. Current LIN is W35427.

23. CSS E/I training in TRADOC schools. No.

24. Examined in

a. TF XXI AWE (Mar 97). No.

System will not be fielded until FY 05.

b. TRAC's Div Design Analysis Study. No.

c. The Nov 97 DAWE. No.

25. Tested elsewhere. No.  
Not to date.

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. Yes. Funding begins in FY 03 and buys 18 of the 60 FP 1 requirement. EPP programmed funds complete 100% fielding of 160 systems by FY 08. Program Funding: MDEP RJL8; PE 64804. Estimated Unit Cost \$350,000.

27. Planned BOIP (connectivity between FP). Yes.  
Plans call for fielding the ROWPU to all four FP.

28. Technical capabilities. Proven.  
Proven in the commercial world. ROWPU will be an Army NDI using COTS technology.

29. LIA's 15 elements of ILS assessment. Assessed.

[This study team was able to determine that OPTEC did conduct an ILS review for the ROWPU. However, limited study time precluded any further attempts to acquire their assessment.]

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). No.  
First system is not available until FY 05.

b. In time for the First Digitized Corps (2006). Yes.

c. During FY 07-10. Yes.

31. Overall Peacetime (Programmatic) risk. Green.

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.

33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation. N/A.

34. Wartime backup (BU) system. BU systems could be the use of many 3000 gallon ROWPU that already exist in EAC, and which will not be replaced by ROWPU fielding. Many units also have individual water purification devices. Bottled water is also a BU option.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. N/A.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. Low.  
There would be minimum risk, especially in an arid environment, for meeting daily minimum water supplies.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Low.  
Plans call for fielding the ROWPU to all four FP. However, if some unit do not get it, then we would likely use the existing 600 gallon units where necessary, along with available BU systems.
38. Other adverse wartime impacts (e.g.; scenario dependent). None.
39. Overall wartime risk associated with employment of this CSS E/I. Green.
40. Overall risk (considering both programmatic and wartime risks). Green.
41. Ordinal ranking of this CSS E/I by the CSS DCD.
42. Cardinal ranking of this CSS E/I by the CSS DCD.
43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities.
44. Remarks. None.
45. Data Sources. Mr. Walker, CASCOM (DCD-QM Dir), DSN: 687-0613), CASCOM Sep 96 CSSMMP and related May 97 updates.

1. Title. Self-Contained Toxic Environment Protective Outfit (STEPO).

2. Designation. FXXI CSS Initiative.

a. Description: The STEPO system is a state of the art life support system which is modular in design. It consists of a one piece totally encapsulating protective outer garment fabricated from a five layer laminated impermeable materiel. STEPO has a four hour closed loop positive pressure self contained breathing apparatus or uses a tethered breathing system. It has an internal voice activated, push to talk communication system which is compatible with existing Army radios. STEPO uses the cooling suit under garment and emergency breathing apparatus from the Improved Toxicological Agent Protective (ITAP) ensemble.

b. Characteristics: STEPO will provide OSHA Level A protection in immediate danger to life and health (IDLH) and oxygen deficient environments. The suit will protect against all known chemical and biological agents, commercial chemicals, missile fuels, static, flame, and POL products. STEPO will cost between \$8-10K per system.

c. Requirement/Need/Mission: For the last forty years, EOD soldiers have used the toxicological agent protective (TAP) M3 suit, M9 mask, Rocket Fuel Handlers Ensemble, and M20 Oxygen Breathing Apparatus (OBA) for protection while working on chemical munitions or in oxygen deficient atmospheres. All these items are obsolete and no longer supportable in the field. The mission of STEPO is to provide the user with four hours of continuous IDLH protection in gross toxic chemical and/or oxygen deficient environments while conducting EOD operations.

d. Milestones: MS III Decision 4th QTR FY97.

3. DTLOMS Area.

a. Primary: Materiel.

b. Secondary: None.

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Modernization.

5. CSS BOS Function.

a. Primary: Arm.

b. Secondary: None.

6. FXXI Priority. High.

High within the CASCOS (DCD-Ord Dir).

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. Low.

[STEPO was prioritized # 49 out of 51 systems. Also, STEPO was prioritized #20 out of 21 Ordnance systems.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed.

9. The 1996 US Army Modernization Plan. Not Reviewed.

10. Prerequisite(s).

a. FXXI E/Is. None.

b. Other prerequisites. None.

11. Overall risk status of

a. Prerequisite E/Is. N/A.

b. Other prerequisites. N/A.

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. N/A.

b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? None.

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? None.

16. Supporting analytical studies. None

[SME stated that STEPO is an ACAT III or IV system and is going to MS III in Sep 97. Therefore he assumed STEPO must have had an approved COEA/AOA, but none was available at the CASCOM for review. Perhaps since STEPO is an ACAT III or IV system, it does not require any AOA per the CDR TRADOC May 93 message which reduced the analysis requirements for such systems.]

17. Changes in manpower requirements caused by fielding this given CSS E/I. None.

18. Related changes in CSS efficiency. Increase.  
Increases safeties to the EOD technician.

19. Related changes in CSS effectiveness. Increase.

Today we cannot legally respond to a chemical hazard contamination with our current protective suit. STEPO will protect from all biological, radiological, toxic chemical, fuel and oxidizer hazards. STEPO will meet all OSHA EPA level A protective standards. Current suit will not meet these requirements.

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself). None.

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Developed.

Concept is approved and part of doctrine as contained in FM 9-15.

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. Yes.

MNS #043-85-93 for EOD.

b. ORD. Yes.

Statement of Need, Individual Clothing and Equipment (SN-ICE), 13 Nov 87. Note: in 1987 the SN-ICE was used to fulfill requirements for the now current ORD.

c. BOIP. Yes.

20 systems per EOD Company will deploy for a 2 MRC scenario. 30 systems per EOD Company (CONUS support). Various systems needed for TDA and OMMC&S training base-total number of systems required is about 1200.

23. CSS E/I training in TRADOC schools. No.

24. Examined in

a. TF XXI AWE (Mar 97). No.

b. TRAC's Div Design Analysis Study. No.

c. The Nov 97 DAWE. No.

25. Tested elsewhere. Yes.

Tested at Pine Bluff Arsenal, AR in Aug 96 and Dugway Proving Grounds, UT., in May 97. Test results were positive. (Also, TEXCOM did an independent evaluation of these tests.)

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. Yes. Both RDT&E and Procurement funding is provided by PM Soldier. Plans call for fielding STEPO also to FP 2 EOD units, but funds may not be sufficient.



[CASCOM SME responded "Yes." However, this study team does not know how much funds are available. But, given that STEPO is scheduled for a MS III decision during the 4th QTR FY97, this study team agrees with an "Yes" response.]

27. Planned BOIP (connectivity between FP). Yes.  
Plans call for fielding STEPO to all FP 1 and 2 EOD units.

28. Technical capabilities. Proven.  
Proven in field trials. DT II at Dugway proving Grounds in May 97; at OT II at Pine Bluff, AR., in Aug 96.

29. LIA's 15 elements of ILS assessment. Assessed.

[This study team was able to determine that OPTEC did conduct an ILS review for the STEPO. However, limited study time precluded any further attempts to acquire their assessment.]

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). Unknown.

[SME responded "Yes." However, it is not clear to this study team if sufficient funds are available. Therefore, this study team assigned an "Unknown" response until this can be resolved.]

b. In time for the First Digitized Corps (2006). Unknown.

[SME responded "Yes." However, it is not clear to this study team if sufficient funds are available. Therefore, this study team assigned an "Unknown" response.]

c. During FY 07-10. Unknown.

[SME responded that STEPO fielding would be completed before FY 06. However, due to funding uncertainties mentioned above, this study team assigned an "Unknown" response.]

31. Overall Peacetime (Programmatic) risk. Amber.  
Lack of adequate funds to field STEPO to all EOD units. Also, the current production base can turn out only so many STEPO. Therefore, this may place EOD units at some risk if a "weapon of mass destruction" accident/incident occurs.

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.

33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation. N/A.

34. Wartime backup (BU) system. There will be absolutely no BU systems for the STEPO once it is fielded.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. High. Given no planned BU systems, EOD units (and maneuver commanders) would be at severe risk if the STEPO was degraded for some reason.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. N/A.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. High. EOD missions include chemical/biological bomb disposal support to the mobilization base, the US land mass, counter-terrorism, and Presidential protection in addition to combat unit support. Fielding STEPO only to selected units (perhaps only to FP 1 EOD units) would seriously degrade the remaining units' abilities to provide this support.

38. Other adverse wartime impacts (e.g., scenario dependent). None.

39. Overall wartime risk associated with employment of this CSS E/I. Amber. "Amber" is assigned given there will be no planned BU system for the STEPO.

40. Overall risk (considering both programmatic and wartime risks). Amber. Lack of funds, slow rate of STEPO production, and no planned wartime BU system.

41. Ordinal ranking of this CSS E/I by the CSS DCD.

42. Cardinal ranking of this CSS E/I by the CSS DCD.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities.

44. Remarks. None.

45. Data Sources. MSG Frey, CASCOM (DCD-Ord Dir), DSN: 687-0566), CASCOM Sep 96 CSSMMP and related May 97 updates.

1. Title. Self- Loading/Offloading Trailer (SLOT).

2. Designation. FXXI CSS Initiative.

Description. The SLOT shall be a multifunctional trailer with a capability to self-load/offload and transport operable and inoperable wheeled and light tracked vehicles, aircraft, MHE, engineer construction equipment, other general cargo, and equipment, and American National Standards Institute/International Standards Organization (ANSI/ISO) containers/shelters (to include S-280 size), up to the vehicle payload capacity. These vehicles shall operate world wide, both on and off road, under all weather conditions. There shall be 45 ton, 40 foot and 22 1/2 ton, 20 foot variants, both with a standard width of eight feet. Side extensions will allow for carrying wide loads. Each variant shall have self-loading/offloading capability operable by the prime mover driver. The SLOT shall replace or augment M172, M269, M270, M870, M871 and M872 series semitrailers and their predecessors when removed from service through attrition. The M818, M915, M916, M920, M931, M932, M1070 and M911 tractors shall tow the SLOT. If necessary, the SLOT shall have two inch and three and one half inch kingpin sizes and the ability to match with various fifth-wheel heights. The SLOT, at the maximum payload compatible with any particular prime mover, shall operate at speeds of the prime mover. The SLOT is intended to be a COTS NDI with minimal modification for military application. The SLOT is intended primarily for use in echelons above division (EAD). It will be found most often in Medium Truck Companies and in Aviation, and Engineer units. The potential exists for use by Med, Ord and QM units.

3. DTLOMS Area.

a. Primary: Materiel.

b. Secondary: None.

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Modernization.

5. CSS BOS Function.

a. Primary: Distribute.

b. Secondary: Fuel, Arm, Fix.

6. FXXI Priority. Low.

[SME responded that SLOT was prioritized #7 out of 7 CASCOM FXXI items. Thus, this study team assigned a "Low".]

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. None.

[SLOT was not listed in this plan.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed.

9. The 1996 US Army Modernization Plan. Not Reviewed.

10. Prerequisite(s).

a. FXXI E/Is. None.

b. Other prerequisites. None.

11. Overall risk status of

a. Prerequisite E/Is. N/A.

b. Other prerequisites. N/A.

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. N/A.

b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? None.

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? None.

16. Supporting analytical studies. None.

None to date. An AOA may not be required.

[SME did not give any reason for the statement that no AOA may be required. However, this study team thinks that if the SLOT is an ACAT III or IV system, then perhaps the CDR TRADOC May 93 message applies-whereby no AOA are required.

17. Changes in manpower requirements caused by fielding this given CSS E/I. Unknown.

The pickup/delivery of items using SLOT could reduce dependence on MHE. However, no SSA TOE is being reviewed for reduction of MHE or operators.

18. Related changes in CSS efficiency. Increase.

SLOT will reduce the time required to transship, thus placing the vehicle back on the road quicker to handle other missions. Also, this will reduce the time needed to coordinate emplacement of MHE at receiving sites.

19. Related changes in CSS effectiveness. Increase.

[Refer to the above paragraph.]

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself). Unknown.

There will be no increase in equipment or organizational requirements. It is Unknown if the SLOT will in fact reduce equipment requirements. The SLOT will replace old trailers or fill in where trailer shortages exist. The impact on reduction in equipment (e.g., MHE) is To-Be-Determined based on equipment mix chosen and placement in units.

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. N/A.  
None required.

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. N/A.

[SME stated that there was a draft MNS developed in 1994, but none is required now.]

b. ORD. No.

A draft ORD is being developed by CASCOT, with a planned completion of mid-summer 1997.

c. BOIP. No.

To-Be-Determined.

23. CSS E/I training in TRADOC schools. No.

24. Examined in

a. TF XXI AWE (Mar 97). No.

b. TRAC's Div Design Analysis Study. No.

c. The Nov 97 DAWE. No.

25. Tested elsewhere. Yes.

Widely used in commercial industry for construction companies transporting vehicles, trailers, containers, etc.

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. No.

27. Planned BOIP (connectivity between FP). Unknown.

[SME responded "To-Be-Determined." Therefore, this study team assigned an "Unknown."]

28. Technical capabilities. Proven.

SLOT's technical capabilities have been proven through its use in the commercial industry.

[Refer to paragraph 2 above and to the CASCOM draft SLOT ORD for a description of the SLOT's required technical capabilities.]

29. LIA's 15 elements of ILS assessment. Not Assessed.

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). Unknown.  
SLOT could be fielded in time if funds were made available.

b. In time for the First Digitized Corps (2006). Unknown.

c. During FY 07-10. Unknown.

31. Overall Peacetime (Programmatic) risk. Amber.  
No approved ORD, complete lack of funds.

[This study team would have assigned a "Red" except for the fact that the SLOT technical capabilities have been widely tested/proven in commercial industry.]

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.  
Threat would be no greater than the threat to any other common user fleet wheeled vehicle.

33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation. N/A.

34. Wartime backup (BU) system. BU systems would entail other, like-capacity trailers supported by available MHE at delivery and pickup sites.

[This assumes that the Army keeps selected MHE/trailers that could otherwise be replaced by SLOT employment.]

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. N/A

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. Medium.  
Degraded capabilities.

[Also, required use of BU systems would be time and labor intensive, thereby affecting maneuver commanders' options.]

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. High.

If we had a mix of SLOT and current trailers/MHE support equipment, then the supply distribution procedures would be less effective. Battlefield Distribution would be adversely affected.

38. Other adverse wartime impacts (e.g., scenario dependent). None.

39. Overall wartime risk associated with employment of this CSS E/I. Green.

40. Overall risk (considering both programmatic and wartime risks). Amber.  
No approved ORD, lack of funds.

41. Ordinal ranking of this CSS E/I by the CSS DCD.

42. Cardinal ranking of this CSS E/I by the CSS DCD.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities. N/A.

44. Remarks. None.

45. Data Sources. Mr. Russakoff, CASCOM (DCD-Trans Dir), DSN: 687-0486).

1. Title. Sensor AI Communications Interactive Maintenance System (SACIMS)

2. Designation. FXXI CSS Initiative.

However, it may transition to an enabler status before 2010 (because it might reduce requirements for maintenance personnel having to go to a vehicle to diagnose and repair it.)

Description: In current configurations, SACIMS is designed solely to support M1A1 and M1A2 main battle tanks. SACIMS, under the name "DDAP," is incorporated into the FBCB2 command and control system FD, version 3. SACIMS was initiated in 1993 by members of the DCD, USAOC&S. Its purpose was to leverage the M1A2 Main Battle Tank's Intra-Vehicular Information System (IVIS) to the extent that critical engine operating parameters could be monitored evaluated and reported in real time; ammunition status ascertained and reported; fuel use measured and reported. SACIMS would be programmable, so that it would report at selected intervals, or upon out-of-tolerance behavior, to specified commanders and logisticians. DDAP was the SACIMS application designed for "analog" tanks, such as the M1A1.

3. DTLOMS Area.

a. Primary: Materiel.

The acquisition and subsequent materiel development of this hardware, software, and its associated components will improve readiness in armored and armored cavalry units.

b. Secondary: Doctrine.

Because SACIMS automates materiel maintenance diagnostics and repair parts requisitioning in tactical units, doctrine will have to be updated.

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Both.

5. CSS BOS Function.

a. Primary: Fix.

b. Secondary: Arm, Fuel, Distribute.

Arm (by means of notification about ammunition status), Fuel (kilometers to empty, and gallons or liters required), and Distribute (directs distribution of repair parts to the user, initiates order for repair parts, ensures that repair parts are located, tracked, and delivered to the user).

6. FXXI Priority. High.

Based upon the Director of Force Development (DFD), US Army Armor Center and School, insistence that SACIMS be incorporated into the FBCB2, version 3. This has occurred.

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. Medium.

[SACIMS was not listed separately in this plan. However, DDAP was listed as a TIGER initiative and prioritized # 28 out of 51 items (and #13 out of 21 Ordnance items).]



8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed.

9. The 1996 US Army Modernization Plan. Not Reviewed.

10. Prerequisite(s).

a. FXXI E/Is. CSS.

(1)FBCB2-CSS Functionality. SACIMS must be hooked up with FBCB2, which at the Forward Support Company will switch its transmissions to ICS3. SACIMS will be installed on M1A1 or M1A2 Abrams tank, and it will be wired to communicate through FBCB2 loaded on the tank's SINCGARS radio.

(2) Then, carefully compressed FBCB2 communications will be switched to the ICS3 at the FSC. Continuing traffic over FBCB2 will be routed over the Administration and Logistics Network (admin/log net) at the company, battery, or troop first sergeant or executive officer radio. The SACIMS link with ICS3 is essential to query the tactical logistics system; to identify, find and order the correct repair parts, and to track their distribution back to the user.

b. Other prerequisites. None.

11. Overall risk status of

a. Prerequisite E/Is.

(1) Medium.

[a. FBCB2-CSS Functionality was assigned by CEFA as having an "Amber" (Medium) risk.

b. Also, the SME reported that the risk for equipping tactical maintenance vehicles with FBCB2 capable radios is "Low." Yet the CASCOM SME for PUMA (refer to PUMA CEFA assessment) indicated an overall RED risk rating for the PUMA due to lack of funds AND lack of FBCB2-compatible radios in the CMT. Thus, this study team elected to assign an "Unknown" until the aspect of the availability of FBCB2 capable radios is resolved.]

(2) Unknown.

[The risk of linking FBCB2 to ICS3 is unknown to this study team.]

b. Other prerequisites. N/A.

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. None.

b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? None.

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? Specify.

Now, main battle tanks are the demonstration systems, but SACIMS could be used on any combat critical weapon system, or "high cost maintenance driver." Upon successful demonstration of the concept, any other enabler/initiative (artillery, missile, engineer, and aviation) requiring automated onboard monitoring and diagnostics reporting systems will be assessed. Technologies employed in the SACIMS software are applicable to IETM developments. Therefore, these will benefit by SACIMS developments, thus lowering costs, and reducing lead times.

16. Supporting analytical studies. Unknown.

17. Changes in manpower requirements caused by fielding this given CSS E/I. None.

However, such decreases may result in the future.

18. Related changes in CSS efficiency. Increase.

When completely fielded, SACIMS will result in force structure equipment efficiencies, because it automates diagnostics and repair parts requisitioning. Thus SACIMS may reduce requirements for maintenance personnel. Having it eliminates the need for a mechanic to have to draw, transport, and unlimber existing TMDE, then climbing onto the M1 tank, opening up access hatches, and hooking up the correct interconnecting cables before actually diagnosing. SACIMS also spares the mechanic from having to manually look up pertinent repair parts information before moving back to the motor pool office, or maintenance unit command post to cross reference parts numbers before entering by hand the requisition.

19. Related changes in CSS effectiveness. Increase.

SACIMS diagnosis faults much more accurately than contemporary TMDE. This, combined with its completely automated repair parts ordering capabilities, ensures correct repairs during the initial effort. Therefore, operational readiness rates for M1 tanks will increase even as maintenance personnel requirements are reduced. But this must be demonstrated.

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself). None. But if SACIMS works as intended, then it offers promising (decreases) prospects in this regard.

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Developed.

SACIMS is included in the draft TIGER concept.

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS: N/A.

None needed.

b. ORD: No.

SACIMS is part of the FBCB2 version 3 Functional Description. Although a "generic ORD" has been prepared for automated onboard monitoring and diagnostic reporting systems, it is unenforceable. Draft ORD amendments have been prepared for the M1 tank, and several other weapon systems, with a 30 Oct 97 expected CASCOM completion.

c. BOIP: N/A.

SACIMS will be applied as an ECP to the M1A1/2 tank's systems specification. This will result in a MWO.

23. CSS E/I training in TRADOC schools. No.

Not yet.

24. Examined in

a. TF XXI AWE (Mar 97). No.

b. TRAC's Div design Analysis Study. No.

c. The Nov 97 DAWE. No.

25. Tested elsewhere. Yes.

During Exercise Focus Dispatch at Fort Knox, Kentucky in May 1995. The SACIMS concept was proven, but key operating functions were simulated. Currently SACIMS is being prepared for a CEP test at the NTC in September 1997.

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. No.

Not yet. Developing POM submission now (25 June 1997).

27. Planned BOIP (connectivity between FP). Yes.

Plan to equip each M1 tank with a SACIMS.

28. Technical capabilities. Proven.

SACIMS leverages commercial efforts already accomplished, such as the ARL TED system. Currently TED is being "miniaturized" to become SACIMS for non-digital ECU on AGT-1500 gas turbine engines. DDAP, a yet unproven component of SACIMS, is being developed to monitor and diagnose DECU.

29. LIA's 15 elements of ILS assessment. Not Assessed.

SACIMS remains a concept. Past "dry" funding spells have retarded its development. The SME opinion is that when regarded from a technical development, proof-of-principle perspective,

SACIMS is "Green." Yet, engineering for production and integration with the M1 tank has not commenced.

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). No.

b. In time for the First Digitized Corps (2006). Unknown

[SME responded "Yes. This is contingent on successful proof-of-principle and funding." However, this study team thought that an "Unknown" was a more appropriate response.]

c. During FY 07-10. Unknown

[SME responded "Yes. If required." However, this study team thought that an "Unknown" was a more appropriate response.]

31. Overall Peacetime (Programmatic) risk. Amber.

Shortage of funding and continuing DDAP development.

[This study team also thinks that the absence of an approved ORD contributes to the "Amber" risk. Further, this study team would have assigned a "Red" except for the fact that SACIMS technical capabilities have been proven.]

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. High

[a. Not knowing the FBCB2-CSS Functionality CEFA assessment results, the SME responded "Low. Threat: not likely (same as M1 tank). RAM failure: unlikely, extremely reliable micro chip based product (SME judgment). Electromagnetic Spectrum: same as FBCB2. SACIMS transmissions are entirely dependent on FBCB2."

b. But, the FBCB2-CSS Functionality CEFA assessment indicated that there would be a "High" likelihood that FBCB2-CSS Functionality could be degraded during wartime (refer to paragraph 32 of the FBCB2-CSS Functionality CEFA). Therefore, this study team assigned a "High."]

33. Likelihood of prerequisite C,CS or CSS E/I wartime degradation. High.

[a. This study team thinks that an appropriate response is "High" due to the combination of a possible "lack of supporting force structure" and the aforementioned "High" FBCB2-CSS Functionality wartime degradation risk).

Rationale: SACIMS requires linkages to FBCB2-compatible radios located in the tactical maintenance vehicles. As the SME reported in paragraph 10 above "(1) SACIMS must be hooked up with FBCB2, which at the FSC, will switch its transmissions to ICS3. SACIMS will be installed

on M1A1 or M1A2 Abrams tank, and it will be wired to communicate through FBCB2 loaded on the tank's SINCGARS radio.

(2) Then, carefully compressed FBCB2 communications will be switched to the ICS3 at the FSC. Continuing traffic over FBCB2 will be routed over the Administration and Logistics Network (admin/log net) at the company, battery, or troop first sergeant or executive officer radio. The SACIMS link with ICS3 is essential to query the tactical logistics system; to identify, find and order the correct repair parts, and to track their distribution back to the user."

With reference to paragraph 11a (1) above: "SME reported that the risk for equipping tactical maintenance vehicles with FBCB2 capable radios is "Low." Yet the CASCOM SME for PUMA (refer to PUMA CEFA assessment) indicated an overall "RED" risk rating for the PUMA due to lack of funds AND lack of FBCB2-compatible radios in the CMT. This study team infers therefore that there is some doubt surrounding equipping tactical maintenance vehicles with FBCB2-compatible radios.

b. Based on the above, this study team assigned a "High."]

34. Wartime backup (BU) system. IETM running on the PUMA provide on-the-spot diagnostics and parts requisitioning capabilities (if indeed IETM and PUMA are available). During combat, BDAR will be appropriately applied. Otherwise, there will be a return to current practices, manual diagnostics (without TMDE) and repair parts ordering.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. N/A.

[It is likely that there will always be some form of manual BU.]

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. Medium.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Medium.  
Limits us to current capabilities in the non-FP1 packages. Lacking the accurate diagnostics and reporting capabilities of SACIMS, it is likely that tanks not equipped with it would exhibit reduced operational readiness.

38. Other adverse wartime impacts (e.g., scenario dependent). None.

39. Overall wartime risk associated with employment of this CSS E/I. Amber.

[SME responded "Green." However, given all of the above information (some of which was not available to the SME when he responded), this study team thinks that the wartime employment risk rating should be "Amber" specifically due to the (a) "Unknown" for the availability of linkages to FBCB2-compatible radios located in the tactical maintenance vehicles, and (b) the "High" likelihood of some wartime degradation to FBCB2-CSS Functionality. Until all of this is resolved, this study team elected to assign an "Amber."]

40. Overall risk (considering both programmatic and wartime risks). Amber.

[SME responded "Amber." This study team agrees for reasons cited in paragraphs 31 and 39 above.]

41. Ordinal ranking of this CSS E/I by the CSS DCD.

42. Cardinal ranking of this CSS E/I by the CSS DCD.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities.

44. Remarks. None

45. Data Sources. Mr. William Kasper, CASCOM (DCD-Ord Dir), DSN: 687-0255.

1. Title. Soldier's Portable On-System Repair Tool (SPORT)- Integrated Family of Test Equipment (IFTE)

2. Designation. FXXI CSS Enabler

Fielding the SPORT will offset the required capability to reduce logistics footprint.

a. Description: The Contact Test Set (AN/PSM-80(V)), a component of the IFTE, is a ruggedized man portable, knowledge based test set used at all levels of maintenance to identify LRU problems, augment weapon systems BIT/BITE, acts as the Army standard platform for electronic technical manuals, and Army standard software downloader. SPORT is a replacement/rebuy/upgrade for the CTS. SPORT is scheduled for fielding FY98.

b. Characteristics: The CTS/SPORT is a modular tester and electronic information delivery device that can be reconfigured to meet maintenance support requirements of different commodity and items at unit level and above. It is one-person portable and is capable of interfacing with standard printers to provide hard copy output. The AN/PSM-80(V) 2 will contain a digital multimeter board, a counter/timer board and a internal combustion engine board. It will replace the STE/ICE in performing expert diagnostic. In addition, it will provide means to upload and download software and support the J1708 digital bus systems. The AN/PSM-80(V)3 contains a V2 counter/timer board, V2 1553B board and GSA test leads. The AN/PSM-80 (V1) will support the PATRIOT, TSG, EOD, AN/TLQ-17, ASAS, AND TMDE. The AN/PSM-80(V2) will support TACOM, and the AN/PSM-80(v3) will support JTUAV, GBS, ATACMS-BAT, ABRAMS, JSTARS, PLADIN, AVENGER, TRAIL BLAZER, TEAM MATE, ATLAS, ATCOM, C2V, AND MLRS.

c. Requirement/Need/Mission: An urgent requirement exists for automatic test equipment at unit level, DS, AVIM , and operational units with missions to support highly complex communications, and other electronic commodity equipment, such as missiles, aircraft, and combat vehicle. Support of equipment on digitized battlefield requires electronic enhancement. The CTS provides needed electronic technical manuals, smart proving and integrated support with automation.

d. Milestones: Fielding ongoing.

3. DTLOMS Area.

a. Primary: Materiel.

b. Secondary: None.

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Both.

Replaces multiple special purpose (analog) automatic test equipment with a single DOD approved family of automatic test equipment.

5. CSS BOS Function.

- a. Primary: Fix.
- b. Secondary: None.

6. FXXI Priority. High.

Based on verbal assessment by Chief of Ordnance. Also, there is a high level of interest for the entire IFTE program at HQDA.

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. High.

[The IFTE family was prioritized #4 out of 51 total items. Also, it was prioritized #1 out of 21 Ordnance items.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed.

[SME responded that the IFTE program made the second band (of priorities) but that such was not forwarded by HQ TRADOC to HQDA.]

9. The 1996 US Army Modernization Plan. Reviewed.

[Page I-14 of this Plan in the Core Support section discusses the IFTE family of test equipment. "...This program (IFTE) is rated "Red" for the near-term (FY 96-98) and "Amber" for the mid-and far-terms (FY 99-11). The shortfall must be overcome by a combination of system specific or antiquated test equipment, all of which increase operational costs.]

10. Prerequisite(s).

- a. FXXI E/Is. None.
- b. Other prerequisites. None.

11. Overall risk status of

- a. Prerequisite E/Is. N/A.
- b. Other prerequisites. N/A.

12. Adverse programmatic (peacetime) risks on

- a. The "prerequisite" E/Is if this given CSS E/I is not fielded. N/A.
- b. The other prerequisites. N/A.



13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? None.

[a. The CASCOM SPORT SME responded that "The IETM will need the SPORT as the computer platform from which it (IETM) will be employed.

b. However, it should be noted that the CASCOM SME for the IETM when responding to the IETM CEFA did not indicate that the SPORT was "required" for the fielding of his IETM initiative. This study team agrees and thinks that IETM could be hosted on many other computer platforms, not necessarily just on the SPORT. Refer to the IETM CEFA in which it reads "...IETM will operate on laptop computers and PDA-initially supported by a wireless modem linked server. This PDA is referred to hereafter as the PUMA. PUMA-or laptop computer-provides the video display."

c. Also, the SPORT SME did not respond that certain weapon systems designated as FXXI enablers/initiatives would in fact "require" the SPORT. Given (a) the SPORT is a replacement/rebuy/upgrade for the CTS, and (b) this study team did not know if new systems actually "require" the SPORT over the existing CTS, "None" was assigned as a response.]

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? Specify. The IFTE components (BSTF, EOTF, ERS, SPORT) taken collectively supplement the Multicapable Maintainer. Without IFTE, the Multicapable Maintainer would not realize the full synergy required for the FXXI maintenance concept as impacted by the planned reductions in maintenance force structure. Also, the fielding of the SPORT would enhance the readiness of many major weapon systems, and could contribute to the retirement of existing obsolete maintenance intensive support systems (LCSS, EQUATE, DSETS, STE-ICE, etc.).

16. Supporting analytical studies. Yes.

IFTE COEA, Jan 92-identified 80% NEOF reduction using the CTS: Mission Area Analysis (MAA) part 14, 6/82- identified lack of and need for general purpose reconfigurable automatic test equipment at DS and GS maintenance levels; MAA, Vol 1, 31 Jul-identified shortage of expert diagnostic maintenance tools for missile systems; USAOMMC&S, MADP deficiency-identified need for more efficient method of receiving, storing and using information in the field.

17. Changes in manpower requirements caused by fielding this given CSS E/I. Unknown. Believe the retirement of displaced systems will offset or reduce manpower requirements.

18. Related changes in CSS efficiency. Increase.

Greater accuracy and reduced time to diagnose and replace UUTs. Elimination of unsupportable test equipment.

19. Related changes in CSS effectiveness. Increase.

The greater accuracy and reduced time in diagnosing and replacing UUTs will directly increase the operational availability rates of supported systems.

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself).  
Decrease.

[SME responded "Unknown." However, another CASCOM SME coordinating CEFA inputs designated this item to be an "enabler" since it would likely "offset the required capability to reduce the logistics footprint." Therefore, this study team elected to assign a "Decrease."]

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Developed.

No need for a separate concept. The Army will use existing/emerging maintenance concepts and doctrine.

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. Yes.

[SME did not provide a date when the MNS, ORD or BOIP were approved. However, a 12 Aug 97 CASCOM briefing on "CSS FXXI Concepts/MNS/ORD" status indicates that the IFTE ROC update is undergoing world-wide staffing, with completion expected 30 Sep 97.]

b. ORD. Yes.

c. BOIP. No.

SPORT BOIP is pending final approval. It will follow the current CTS BOIP with minor modifications. BOIP/TOTAL REQUIREMENT: V1 is authorized 1 per PATRIOT maintenance team and 6 per EOD Detachment. LIN: T77431; BOIP# P034AA. V2 is authorized 1 per unit maintenance support team and 2 per Maintenance Co, FSB. LIN: T77499; BOIP# P034AB. It replaces STE-ICS (LIN: A56243). The V3 is issued 1 per MOS 45E supporting AVENGER, Paladin and M1A2 tank. LIN: T77567; BOIP# P034AC. SPORT will be issued to meet V1, V2, and V3 requirements.

23. CSS E/I training in TRADOC schools. Yes.

24. Examined in

a. TF XXI AWE (Mar 97). No.

b. TRAC's Div Design Analysis Study. No.

c. The Nov 97 DAWE. No.

25. Tested elsewhere. Yes.

The CTS is already fielded to some units. Also, an "User Assessment" test for the SPORT is to be conducted at an yet-to-be-determined date.

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. Yes.

Funding exists in the FY 98-03 POM to meet the Army Objective. PROGRAM FUNDING: MDEP FL8G SSN MB4002. Estimated cost per unit. V1= \$15,184.00, V2=\$18,804.00, V3=\$14,883.00. SPORT=\$5.500.00.

[CASCOM briefed the CDR TRADOC on 3 Apr 97 that "...SPORT: follow-on to the CTS but replaces through attrition only. Cost: \$5,458 each. Additional \$12.3M needed. Total requirement continues to change as new users are identified."]

27. Planned BOIP (connectivity between FP). Yes.

[SME responded "Not Relevant." Further, this study team was only provided funding information as shown in paragraph 26 above, without any breakout by FP or by individual IFTE component. However, paragraph 22 above indicates "...Estimated total requirement-21662 (FP I-9,600; FP II/IV-12,062). Thus this study team responded with a "Yes."]

28. Technical capabilities. Proven.  
COTS/NDI.

29. LIA's 15 elements of ILS assessment. Unknown.

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). Yes.

b. In time for the First Digitized Corps (2006). Yes.

c. During FY 07-10. N/A.

31. Overall Peacetime (Programmatic) risk. Green.

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.

The SPORT is composed mainly of developmental items based on COTS; RAM failures are expected to be minimal. Threat to the SPORT would be no worse than the threat expected to other divisional/Corps maintenance units.

33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation. N/A.

34. Wartime backup (BU) system. No direct/redundant BU systems are planned, other than perhaps the use of a SPORT from another maintenance unit.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. Medium. Delay times in on-system diagnosing of failed UUT would increase. NEOF rates would likely increase, as caused by UUT suspected of failure being replaced without accurate diagnosis. This in turn could cause increases in the number of UUT items requiring stockage, as well as adversely affecting supported weapon system operational availability rates.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. N/A.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Medium.

[a. SME responded "Unknown" and discussed that fielding IFTE program components is constrained by the availability of funds, completed TPS for the supported systems, and sufficient supporting manpower.

b. However, as discussed in paragraph 22 above "...SPORT BOIP is pending final approval. It will follow the current CTS BOIP with minor modifications. BOIP/TOTAL REQUIREMENT: V1 is authorized 1 per PATRIOT maintenance team and 6 per EOD Detachment. LIN: T77431; BOIP# P034AA. V2 is authorized 1 per unit maintenance support team and 2 per Maintenance Co, FSB. LIN: T77499; BOIP# P034AB. It replaces STE-ICS (LIN: A56243). The V3 is issued 1 per MOS 45E supporting AVENGER, Paladin and M1A2 tank. LIN: T77567; BOIP# P034AC. SPORT will be issued to meet V1, V2, and V3 requirements.

c. If some units do not receive the SPORT due to a lack of funding, they then would have to retain their present on-system testers (if they had any). In these cases when their weapon systems receive upgrades or new systems are fielded, they then might not be able to support automatic test diagnosis with their present (legacy) on-system test equipment. Also, for units without the SPORT we would likely have to increase our stockage of UUT in the theater. This in turn will drive up CL IX costs and adversely affect the usage of in-theater transportation assets. Based on the above discussion, this study team assigned a "Medium" response to this question.]

38. Other adverse wartime impacts (e.g., scenario dependent). Unknown.

[SME responded with an "Unknown." This study team elected to leave this response, but tends to think that a "None" response could be more appropriate.]

39. Overall wartime risk associated with employment of this CSS E/I. Amber.

[a. SME responded in paragraph 32 above that there is a "Low" likelihood that the SPORT will suffer wartime degradation. However, in paragraph 35 above a "Medium" adverse wartime impact was assigned if the SPORT did in fact become inoperable during a war with no planned BU systems. Thus, the SME assigned an "Amber" response to this question.

b. Throughout the conduct of CEFA, several other SME responded similarly for their respective FXXI enablers/initiatives. However, they did not in all cases think that such warranted a wartime risk of "Amber." In each case a given SME subjectively assessed the wartime implications unique to his/her enabler/initiative, and then applied personal thresholds for "risk adverseness." In this particular case and based on all of the above information, this study team agree to leave the "Amber" response.]

40. Overall risk (considering both programmatic and wartime risks). Amber.

[Due to its estimated wartime employment risk.]

41. Ordinal ranking of this CSS E/I by the CSS DCD.

42. Cardinal ranking of this CSS E/I by the CSS DCD.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities.

44. Remarks. None.

45. Data Sources. MAJ Mabry, CASCOM (DCD-Ord Dir), DSN: 687-0342). CASCOM Sep 96 CSSMMP and related May 97 updates.

1. Title. Tactical Electric Power (TEP) and Associated Systems.

2. Designation. FXXI CSS Enabler.

Pre-AWE assessment demonstrated that the Experimental Force's (EXFOR) generator requirement could be cut 16%

- Eliminates remaining gas-fueled generators, supporting the AOE single fuel concept.
- MTBF (on some generators) doubled-leads to higher operational availability and a

reduction in "redundant power" comfort alternatives.

Some of the 37 separate and distinct configurations are being fielded now.

Approximately 50% of required FP1-4 quantities should be fielded by FY 03. The remainder will take until 2015-2020 during which time block improvements will be developed for those currently being fielded and the evolutionary process continues as an on going acquisition cycle.

a. TEP-Description:

(1) TEP includes all mobile (skid-mounted), wheel-mounted (trailer or portable) and engine driven (diesel, JP fuels, fuel cells, etc.) generators sets, including those that are embedded components of systems. Current TEP consists of a prime mover (engine), generator (alternator), a mounting base (skid or trailer), controls for both the engine and generator, and a housing designed to protect the set from the elements while acting to reduce noise, thermal and infrared signatures. A new family of military generators, comprised mostly of Tactical Quiet Generators (TQG), are being developed in 34 separate configurations (skid, power unit and power plant) to replace military standard generators that are old (20+ years), gasoline powered and logistically unsupportable in combat, CS and CSS units.

(2) Characteristics: TQG meet critical needs for improved mobility/force projection (reduced size and weight), reduced battlefield signature (noise and infrared), improved survivability (CARC, High Altitude Electromagnetic Pulse, and Electromagnetic Interference protected), reduced ownership costs (operation and support), improved readiness (higher reliability), reduced fuel consumption, interoperability (50/60 Hz and 400 Hz), and comply with the single fuel on the battlefield concept (all diesel/JP). TQG are crucial to operational readiness in all types of units, whether combat arms, combat support, combat service support; forward or rear; light or heavy; air, land or sea.

(3) Requirement/Need/Mission: The Force XXI Army requires highly technical, automated and digitized equipment. Our challenge is to provide these and other electrical power consumers with the requisite quality of power where and when its needed. TQG significantly enhance battlefield effectiveness and survivability by:

- decreasing aural detectability from over 1000M to within 400M
- eliminating infrared (IR) detectability (except for the radiator end of the set)
- improving trailer payload, mobility and transportability (by reducing size and weight)
- increasing supported weapon system availability (through improved reliability and less frequent PMCS)
- reducing, by at least two, the number of C-141 sorties required to deploy a light division sized force

- allow more funding for lethal weapon system modernization (through reduced life cycle O&S costs)

(d) Milestones: First Unit Equipped was Dec 93 (5-60 kW only) with a follow on buy contract awarded in Feb 95. The 2 kW will be fielded in limited quantities (650) by 2Q FY97, with a follow on competitive procurement contract fielded in late 1997 or early 1998. The 3 kW TQG is being produced by three contractors with a down select to one scheduled for late 1997.

b. Distribution Illumination Systems, Electrical (DISE):

(1) In response to a March 1984 Letter Requirement (LR), from AMC/TRADOC, PM-MEP developed and provided standardized man-portable electrical distribution equipment for various complexes. Originally designed for standardized Army medical applications, the end item compositions have been restructured to broaden DISE usage for other Army field unit shelter complexes to reduce the number of fielded generator sets. DISE provides reliable, quick to assemble power networks, in modular design, which meet the full range of specifications and testing requirements. Consisting of cabling and circuit protection equipment, the systems will subdivide and distribute electricity from single power sources to multiple equipment users within shelters and various unit complexes. The systems interface with DOD standard generator sets from 5kW to 200kW, as well as other power sources and components. Panel boards and cable assemblies offer a wide range of parallel or serial connection choices.

(2) The DISE System consists of the following end items:

- Electrical Distribution System, Single-Phase, 60 amps
- Electrical Distribution System, Three-Phase, 40 amps
- Electrical Feeder System, Three-Phase, 100 amps
- Electrical Feeder System, Three-Phase, 200 amps
- Utility Assembly, Electrical, Receptacles and Lighting

3. DTLOMS Area.

a. Primary: Materiel.

The acquisition and subsequent materiel development of this hardware capability is designed to satisfy capability deficiencies IAW Requirements Documents approved in late 1980s and early 1990s.

b. Secondary: Doctrine, Organization.

Doctrine: Affects tactical dispersion and power grid determinations for generator emplacements.  
Organization: Optimizing the power grid and making accurate assessments of true power requirements will result in a lower number of generators as well as the right size (kilowatt) generators to avoid wet stacking the diesel engines.

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Both.

Some models will introduce computerized, automated, digital operator panel displays for the first time as well as modernized, sophisticated integration of commercial components. Future product

improvements will include a data buss that diagnoses and prognoses potential operational mission failures, as well as being annotated in ETM/IETM formats.

5. CSS BOS Function.

a. Primary: Man

b. Secondary: Arm, Fuel, Fix, Distribute.

FIX (provides electric power for maintenance shop sets and tools, as well as welders, Contact Maintenance Truck Forward Repair System, etc.), ARM (primary power source for missile launchers, target acquisition radar, guidance systems, etc.), FUEL (single fuel directive, Battlefield Distribution, Total Asset Visibility, etc.), and MOVE (facilitates mobilizations and deployments because of smaller footprint, weight reductions and cube reductions).

6. FXXI Priority. Medium.

Based on its requested participation in Force XXI AWE by Divisional personnel. Subsequent briefings at Ft Hood substantiate and support this affirmation.

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. High

[TEP (TQG) was prioritized #10 out of 51 items, and # 4 out of 21 Ordnance items.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed.

9. The 1996 US Army Modernization Plan. Reviewed.

[TEP is discussed on page I-16 of this Plan within the CORE Support Program. "The new tactical quiet generators support new system fieldings and replace antiquated military standard systems, which average 18 years of age. The new generators standardize fuel, provide audible and signal suppression, improve high altitude electromagnetic pulse protection to electrical power systems and reduce operations and maintenance costs. The Tactical Electrical Power program for near-term (FY 96-98) is rated "Amber." Only the contingency force receives this equipment. Resources are unavailable to support forward deployed and follow-on forces, and peacekeeping and humanitarian missions. The mid-and far terms (FY 99-01 and 02-11 respectively) are rated "Red" because inadequate funding for replacements.]

10. Prerequisite(s).

a. FXXI E/Is. None.

b. Other prerequisites. None.



[SME responded: "NO/DON'T KNOW. The DISE needs the generators and the generators need some power consuming customer to provide power to." However, these items are not "FXXI enablers/initiatives." This study team considers the DISE as part of the overall "TEP and Associated Systems."]

11. Overall risk status of

- a. Prerequisite E/Is. N/A.
- b. Other prerequisites. N/A.

12. Adverse programmatic (peacetime) risks on

- a. The "prerequisite" E/Is if this given CSS E/I is not fielded. N/A.
- b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? Specify.

Many (lights, computers, automation, communication (MSE, etc.), command and control, weapon systems, missile systems, target acquisition systems, guidance systems, launch platforms, causeways, refrigeration, food service, hospital/medical treatment facilities, laundry units, Force Provider, Well Kit, Printing Plant, Topographic Support Systems, Water Purification Units, Printing Plants, Bakery Plants, ADP Systems, Calibration Facilities, Maintenance Shop Sets, Aviation Facilities, Air Traffic Control units, Schools, Earth-Satellite facilities, and any other system(s) requiring electricity to operate.

[The CASCOM SME responded that many systems "require" the TEP. However, this study team does not think that "all" the aforementioned systems "require" the new TEP; rather that perhaps these systems would greatly "benefit" by being supported by the new TEP versus existing power generation systems. If such were the case, then based on the currently limited fielding of the new TEP, many systems would not be operational (refer to paragraph 9 above: "...Only the contingency force receives this equipment. Resources are unavailable to support forward deployed and follow-on forces, and peacekeeping and humanitarian missions. The mid-and far terms (FY 99-01 and 02-11 respectively) are rated "Red" because inadequate funding for replacements."]

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. Medium.  
Renders power consuming weapons systems inoperable and unsupportable in a tactical/field environment.

[Based on the above SME response, this study team assigned a "Medium."]

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? Specify.

Any other enabler/initiative requiring electricity to operate and/or maintain. Unable to reply specifically until the combat arms and combat support communities publish their respective Force XXI enablers/initiatives lists.

16. Supporting analytical studies. Yes.

COEA (completed in 1987-1988 timeframe to support Milestone I IPR), TEP Cost Reduction Plan (completed in 1997 by the Office of the DOD Project Manager for Mobile Electric Power (PM-MEP), Mobile Electric Power Master Plan completed in 1996 by PM-MEP.

17. Changes in manpower requirements caused by fielding this given CSS E/I. None.

18. Related changes in CSS efficiency. Increase.

(a) Associated Distribution System (DISE) allows maximization of tactical electric power generation capabilities and efficiencies within a tactically dispersed grid. (b) TQG provide fuel savings over their MIL-STD counterparts, consuming about 134,000 fewer gallons per division each year, and providing substantial operation and support cost savings. Reduced fuel consumption (by 16%), supports single fuel forward concept (generators are still the most numerous users of gasoline in the force today). From a war-fighting standpoint, this is approximately 54 HEMTT fuel tanker loads the division won't have to transport each year to sustain its generator operating capabilities. (c) TQG MTBF rates are in the 500-600 hour range as opposed to the 200-300 hours MTBF for MIL-STD sets; leads to higher operational availability and a reduction in "redundant power" comfort alternatives. The preventive maintenance checks and services workload and scheduled maintenance requirements are significantly reduced (improved reliability/availability/maintainability (50%), reduced PMCS intervals (by 65%), reduced scheduled maintenance intervals (by 25%)). (d) interoperability with other 24V systems (allows slave starting in temperature extremes either to or from the generator; and (e) other: reduced sorties for deployments (2 1/2 per heavy division), enhanced mobility/transportability through decreased size and weight (19% smaller and lighter).

19. Related changes in CSS effectiveness. Increase.

Reduced noise detectability (80%), reduced thermal and infrared detectability, survive high altitude electromagnetic pulse, improved quality of power (IAW mil-std 1332), electromagnetic interference suppressed, and operable in temperature extremes (-25F to +120F).

Impact of TQG on the Battlefield Commander: Survivability considerations are and will be extremely important to a division operating in a combat environment on tomorrow's battlefield. The current MIL-STD generators are loud and easy to locate by sound, especially at night. An enemy soldier can hear MIL-STD generators running from about one kilometer away, but TQG cannot be heard beyond 400 meters.

TQG have greatly reduced infrared signatures making them a much smaller IR target. TQG cannot be detected by Apache or other FLIR when oriented to the avenue of approach. Threat forces have a significantly harder time trying to detect and target division C3I assets, weapons systems, and

other facilities that rely on generators for electric power. With TQG, a combat unit can significantly reduce perimeter security distances.

How does the introduction of TQG affect the Battlefield Commanders? As an example, the 5-60kW generator set requirements for a typical mechanized infantry division are shown in the above graphic with the improvements provided by TQG vice MIL-STD MEPGS. With the reduced weight of the new TQG over current MIL-STD generators, the division will be able to deploy to the theater of operations in three fewer C-141 airlifts. The new 3/4 ton (High Mobility Trailer-HMT) trailer-mounted 5kW, 10kW, and 15kW generator sets will provide enhanced tactical mobility, increased payload, and much safer tracking behind a HMMWV.

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself). Decrease.

The quantities and sizes (density mix) of mil-standard generators should be reduced.

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Developed

Developed (and approved) IAW the OMS/MP which is part of the Requirements Document.

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. Yes

All supporting documentation was approved in the late 1980s and early 1990s.

b. ORD. Yes

c. BOIP. Yes

BOIP/TOTAL REQUIREMENT: The overall number of generators (all sizes) is being reduced from 125,000 presently, to around 67,000 (Force Package I-18,800; Force Package II-10,900; Force Package III-17,300; Force Package IV-19,800). These figures include 28V DC, 60 Hz, 50/60 Hz, 400 Hz, skid, power units (one generator on a trailer), and power plants (two generators on a trailer or two power plants connected for parallel operations). A power consumer study is underway, under the auspices of DA DCSOPS and US Army Force Management Support Agency (USAFMSA), to determine the proper force structure allocation and procurement quantities for 2 kW, 3 kW and 5 kW generators. Eventually this will be expanded to include all size generator sets and TOE authorizations.

23. CSS E/I training in TRADOC schools. Yes

TEP is being taught in TRADOC schools. TTP, POI and lesson plans exist.

24. Examined in

a. TF XXI AWE (Mar 97). Yes

114 TQG sets were fielded to participating units.

[It is not clear to this study team if TQG were in fact "examined" in TF XXI. No test results were provided to this assessment.]

b. TRAC's Div Design Analysis Study: No.

c. The Nov 97 DAWE. Yes

[SME responded "Definitely. These are the only generators used in FP1 Div units." However, it is not clear to this study team if TEP will in fact be "examined" (read "tested") during the DAWE.]

25. Tested elsewhere. Yes

Yes, selected models (5 kW, 10 kW, 15 kW, 30 kW and 60 kW along with the DISE) completed First Article Testing, Technical Testing, and Operational Testing between 1991 - 1994 at Ft Hood, Ft Carson, Aberdeen Proving Ground, and various independent and Contractor's Test Facilities.

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. Yes

Yes, into most of FP2 for a multitude of supported combat, combat support and combat service support weapons systems as identified above and still yet to be identified through the Data Interchange process. Funding (OPA) profile for the 2 kW MTG follows: FY 98: \$.7M, FY 99: \$13.2M, FY 00: \$12.2M, FY 01: \$8.1M. This allows fielding to FP1 units (2,192 sets), FP2 units (1,072 sets), and a small portion of FP3 units ("X" out of 2,108 sets). None of the FP4 units (2,922 sets) are funded in the POM years. Funding (OPA) profile for the 3 kW TQG follows: FY 98: unfunded, FY 99: \$7.9M, FY 00: \$15.4M, FY 01: \$12.1M, FY 02: \$4.5M. This allows fielding to FP1 units (4,597 sets) and FP2 units (2,128 sets). None of FP3 units (4,476 sets) or FP4 units (4,636 sets) are funded in the POM years. Funding (OPA) profile for the 5-60 kW TQG follow: FY 98: \$6.0M, FY 99: \$53.0M, FY 00: \$73.0M, FY 01: \$71.0M, FY 02: \$36.0M. This allows fielding to FP1 units (12,052 sets), FP2 units (7,720 sets), and a portion of the FP3 units (10,732 sets). None of FP4 units (12,127 sets) are funded in the POM years. DISE funding is \$1.4M in the POM years which allows a majority of the required quantities to be fielded.

Funded in the Ext'd POM (By what FP? For what given weapon system?) Yes, for most of FP3 and FP4 units for a multitude of supported combat, combat support and combat service support weapons systems as identified above and still yet to be identified through the Data Interchange process. Extended POM funding profile for the 2 kW MTG and 3 kW TQG follows: FY04 - FY12: \$97M. This allows completion of fielding to FP3 and most if not all of FP4 units. Extended POM funding profile for the 5-60 kW TQG follow: FY04-FY12: \$240M. This allows completion of fielding to FP3 units and most FP4 units. (12,052 sets), FP2 units (7,720 sets), and a portion of the FP3 units (10,732 sets). None of FP4 units (12,127 sets) is funded in the POM years. DISE funding is \$2.6M in the extended POM years which should complete fielding through FP4 required quantities to be fielded.

27. Planned BOIP (connectivity between FP). Yes.

Plan is to field to all Force Packages eventually. This time frame is entirely dependent on funding received and funding retained. Many new power consuming customers not yet identified will claim

ownership of various size and quantities of generators for their yet-to-be-fielded systems. This is known as the Data Interchange process. Meetings are held at least once a year to allow claimants to come forward and document their requirements with the appropriate AMC MACOM item managers.

28. Technical capabilities. Proven.

The systems are comprised of a compilation of 80-90% commercially available components. These capabilities have been tested as described above. The remaining 10-20% capability is the hardest and most expensive as the commercial base is militarized to perform its worldwide applicable missions.

29. LIA's 15 elements of ILS assessment. Assessed

Initially fielded sets were Green on all elements of ILS at the time of materiel release. Rebuy sets are yet to be rated.

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). Yes.

In DAMPL sequence IAW DA DCSOPS guidance.

b. In time for the First Digitized Corps (2006). Yes.

In DAMPL sequence IAW DA DCSOPS guidance.

c. During FY 07-10. Yes.

In DAMPL sequence IAW DA DCSOPS guidance.

31. Overall Peacetime (Programmatic) risk. Green

"Green" for FP 1 and 2. "Amber" for FP 3 and 4.

[This study team elected to rate this overall response as "Green". It was felt that an "Amber" rating would have been unfair to a large portion of this program.]

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low

Threat: not likely. RAM failure: unlikely. Force Structure: Likely. Availability of HMT, Prime Movers Trucks, other associated trailers, and MHE in the force structure will absolutely impact the fielding and performance of TEP.

[However, the SME also indicated that the expected degradation due to lack of supporting force structure would not be "adverse." Therefore, this study team assigned a "Low."]

33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation. N/A.

34. Wartime backup (BU) system. BU systems would likely be other available TQG, or perhaps commercial power. Also, some current generators will likely also be available.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. N/A. We are likely to have some form of BU power available.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. Medium

[SME responded "Limited operations in both temperature and altitude extremes. Other impacts affected are in the areas of electromagnetic interference, electromagnetic pulse, NBC survivability, single fuel, reliability, availability, etc." Based on this response, this study team assigned a "Medium."]

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Medium

[SME responded "Most prevalent impacts are in enemy detection (thermal, noise and IR signatures are detectable in the current generators), decreased survivability (since the enemy can detect your location with the current generator fleet), gasoline stays in the inventory (requiring dedicated fuel pods for gasoline which detracts from the number that can be used for diesel/JP), supply and maintenance are overburdened (PLL and ASL stockages must include spare and repair parts as well as special tools for both the current sets and the TQG), etc." Based on this response, this study team assigned a "Medium."]

38. Other adverse wartime impacts (e.g., scenario dependent). Medium

[SME responded "Operations in either temperature extremes or altitudes would be hampered. Generator sets are dependent on a strong engine to excite the system. Generator electricity output is naturally degraded at high altitudes and extreme (either hot or cold) temperatures." Based on this response, this study team assigned a "Medium."]

39. Overall wartime risk associated with employment of this CSS E/I. Amber.

[SME assigned an "Amber" based on information contained in paragraph 36 and 38 above. Throughout the conduct of CEFA, several other SME responded similarly for their respective FXXI enablers/initiatives. However, they did not in all cases think that such warranted a wartime risk of "Amber." In each case a given SME subjectively assessed the wartime implications unique to his/her enabler/initiative, and then applied personal thresholds for "risk adverseness." In this particular case and based on all of the above information, this study team agree to leave the "Amber" response.]

40. Overall risk (considering both programmatic and wartime risks). Amber

[This study team assigned "Amber" based on the wartime employment "Amber" risk.]

41. Ordinal ranking of this CSS E/I by the CSS DCD.

42. Cardinal ranking of this CSS E/I by the CSS DCD.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities.

44. Remarks. Visit the PM-MEP Homepage at <http://www.erols.com/pmmep/pmmep.htm>. Also, the Mobile Electric Power Master Plan (1996) and TEP Cost Reduction Plan (1997) are excellent sources of historical, present day, and future tactical electric power initiatives.

45. Data Sources. Mr. Chad Myers, CASCOM (DCD-Ord Dir), DSN: 687-2967. CASCOM Sep 96 CSSMMP and related May 97 updates.

1. Title. Telemedicine (T-Med)

2. Designation. FXXI CSS Initiative.

a. The AMEDD T-Med FXXI initiative provides real-time medical situation awareness and casualty care to the soldier in a distance-and time-independent manner through superior medical monitoring and clinical consultation throughout the battlefield. Care for the warfighter will be substantially improved and medical assets optimized.

b. This program exploits advanced medical technologies, integrating modalities (audio, visual, and digital) to network patient care from echelon 1 division units to echelon 5 CONUS-based facilities. This ability to virtually project forward the right skill mix and clinical capabilities greatly enhances the quality of health care provided to the soldier. In particular, T-Med insertion of specialty consultation from an expert location allows valuable and critically short personnel resources to be dual resourced against deployed and fixed patient loads.

c. T-Med technology is multi-faceted with applications in support of war and operations other than war to include humanitarian assistance and disaster relief. This initiative is the medical support complement to the Army's force projection strategy and fully integrates with the digitization of the battlefield effort.

d. T-Med is a part of the MC4 umbrella FXXI medical initiative.

3. DTLOMS Area.

a. Primary: Materiel.

b. Secondary: None.

4. CSS E/I Type (Digitization/Modernization (D ,M, Both)). Both.

5. CSS BOS Function.

a. Primary: Man.

b. Secondary: None.

6. FXXI Priority. Unknown.

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. None.

[T-Med was not listed in this plan.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed



9. The 1996 US Army Modernization Plan. Reviewed.

[T-Med was "indirectly" reviewed. AMEDDC&S SME reported that T-Med is a subcomponent of the MC4 system. Page L-9 of Annex L, Combat Health Support indicated that: "...C4I (Command, Control Communications, Computers, and Intelligence) must provide for and manage horizontal and vertical technology insertion into all organizational designs, including MC4." This plan rated medical C4I as Red for the near-term (FY 96-98) because of the increased need for communications and split-base operations for Combat Health Support command and control elements. The Plan related medical C4I as Red for FY 99-11 primarily due to the lack of identified funds.]

10. Prerequisite(s).

a. FXXI E/Is. None.

b. Other prerequisites. CS

Communications systems for the prototype version of T-Med now depend on Portable Satellite Communications. No defined solutions exist yet for T-Med communication systems.

11. Overall risk status of

a. Prerequisite E/Is. N/A.

b. Other prerequisites. Unknown.

Planned availability of battlefield communications to support T-Med is unknown.

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. N/A.

b. The other prerequisites. None.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? Specify.

[The AMEDDC&S SME for the Air Ambulance (UH-60Q) CEFA assessment responded that "Telemedicine appears to be the only E/I related to the UH-60Q." He further wrote, "The UH-60Q provides improved...command and control and telemedicine systems. Lastly, refer to paragraph 9 above. It cites the 1996 Army Modernization Plan, which indicates that the UH-60A MEDEVAC is not capable of functioning on the digitized battlefield or using telemedicine technology.]

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? Specify.

[a. MC4 needs the T-Med initiative in order to realize its (MC4) maximum synergistic benefits derived from the collection of patient information from many different sources. T-Med is just one of several (e.g., WPSM, MEDLOG-D, TMIP) medical initiatives that input to the MC4 initiative.

b. The efficiency/effectiveness of MC4 would be degraded if T-Med were not fielded. Manual and time consuming methods would have to be used to capture the data which otherwise would be provided by T-Med to MC4.]

16. Supporting analytical studies. None.  
No analytical studies exist.

17. Changes in manpower requirements caused by fielding this given CSS E/I. Increase.  
There may be an increase as the cost of this type of technology may preclude it from being fielded everywhere. Consequently, we may need a specialty team(s) to be deployed with the Combat Hospitals in order to provide T-Med service/expertise..

18. Related changes in CSS efficiency. Increase.  
No empirical data to support this answer. Testing to be completed in Spring 98 as part of the TMIP; location is unknown to SME. As a minimum, T-Med is expected to permit more timely and accurate medical consultation than currently procedures.

19. Related changes in CSS effectiveness. Increase.  
No empirical data to support this answer. Testing to be completed in Spring 98 as part of the TMIP; location is unknown to SME. As a minimum, T-Med is expected to save more lives on the battlefield.

20. Related force structure (equipment and/or organizational) changes.

- a. In equipment (other than the equipment associated with the given CSS E/I itself). None.
- b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Not Developed.

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. No.  
T-Med is covered under the umbrella MC4 FXXI initiative. Approval of an Army-unique MC4 MNS is expected in Aug 97. However, a Mar 96 Joint TMIP MNS is applicable for T-Med.

b. ORD. No.  
A separate Army-unique ORD will be developed in the future.

c. BOIP. No.

Not yet developed.

23. CSS E/I training in TRADOC schools. No.  
Not yet.

24. Examined in

a. TF XXI AWE (Mar 97). Yes.

The AMEDD Test Board has not released the test results as of 15 Jul 97.

[This study team was able to obtain a copy of:

(1) a 9 Jun 97 CASCOM briefing presented to BG Dayan (Israeli Army). It briefly discussed T-Med as follows. "... MC4. Description: MC4 provides the capability to project medical knowledge and expertise...this is accomplished through telementoring, teleconsultation, and the medical digital assistant. ...AWE Insights: Teleconsultation received limited use, but when used, the links were successful. Telementoring most useful in light infantry. NTC is not the environment to test medical systems which require the stress of wounding, and (2) a TRAC-LEE May 97 briefing concerning emerging results of the TF XXI AWE CSS analysis it reads in part: "...Medical Initiatives-Indications based on the SME (TFXXI) are that these initiatives saw little use during the AWE...analysis continuing."]

b. TRAC's Div Design Analysis Study. No.

c. The Nov 97 DAWE. Unknown.

[This study team knows that MEDLOG-D is the only "medical" initiative to be assessed by TRAC in the upcoming DAWE. However, other medical initiatives may be examined by non-TRAC agencies.]

25. Tested elsewhere. Yes.

(a) PACOM (AKAIMA project-a Joint Navy, Air Force and Army (25ID) project) at Tripler Army Hospital, and (b) PRIMETIME III (Bosnia) ongoing. Test results and related AAR are not available to SME. Some of these "tests" are more like "demonstrations".

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. Unknown.

[However, \$10M has been budgeted in the POM (FY 99) for MC4 for selected FP1 units. This study team does not know the extent to which this covers T-Med, and therefore assigned an "Unknown."]

27. Planned BOIP (connectivity between FP). Unknown.  
BOIP not yet developed.

[SME did not know fielding plans.]

28. Technical capabilities. Unproven.

There are no studies or tests that support the use of telemedicine in a MRC. Some tests exist for SASO-e.g., BOSNIA. In the civilian sector certain aspects of telemedicine technologies have been examined. However, there exist a different set of parameters (e.g., communications) between a civilian application and that expected on the FXXI battlefield.

29. LIA's 15 elements of ILS assessment. Unknown.

[Most likely not examined given the stage of development for T-Med.]

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). Unknown.

b. In time for the First Digitized Corps (2006). Unknown.

c. During FY 07-10. Unknown.

31. Overall Peacetime (Programmatic) risk. Amber.

No Army-unique ORD has yet been developed for T-Med, and there are inadequate development/procurement funds.

[a. Also, there is the possibility of a need for additional manpower requirements. The SME reported in paragraph 17 above that "There may be an increase as the cost of this type of technology may preclude it from being fielded everywhere. Consequently, we may need a specialty team(s) to be deployed with the Combat Hospitals in order to provide T-Med service/expertise.

b. SME responded that his rating would have been "Red" except for the fact that the T-Med technology has been made to work in an Army field environment. However, it has not been subjected to rigorous Army testing.

c. Notwithstanding the above, this study team agrees with the SME on this rating.]

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.

Threat/RAM to T-Med requirements/technologies is expected to be Low. To date necessary technologies have been made to work in the civilian and garrison environments, but not yet in the field.

33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation. Unknown.

[Neither the SME nor this study team was able to assess the likelihood of possible wartime degradation to MSE/battlefield communication systems-especially if they become severely overloaded due to use by many different functional systems.]

34. Wartime backup (BU) system. There are numerous "BU" processes that have been used for years. T-Med is designed to increase the efficiency and effectiveness of these processes. No artificial intelligence (AI) aids presently exist to mitigate the current non-availability of T-Med. However, the AMEDDC&S is working on possibly alleviating this issue.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. N/A.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. Medium.

The delivery of health care and the medical evacuation of casualties would continue without T-Med. However, there would be a decrease in the efficiency of these actions.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Low.

38. Other adverse wartime impacts (e.g., scenario dependent). None.

This initiative will operate better the more static the medical activity is (e.g., PRIMETIME III medical operations where medical units are in hard stands and do not move.)

39. Overall wartime risk associated with employment of this CSS E/I. Amber.

The likelihood of having "specialty" care (Army and/or contractor) on the battlefield will be reduced as Defense drawdowns continue. Also, we do not expect to have an adequate BU system commensurate with the anticipated dynamic nature of the FXXI battlefield. Therefore, there is some risk that we may not be able to provide in-Theater patient care and would then have to evacuate patients out of Theater. This in turn adversely could affect the personnel replacement system and use of strategic lift assets.

40. Overall risk (considering both programmatic and wartime risks). Amber

No Army-unique ORD has yet been developed for T-Med. Inadequate development/fielding funds. Expected lack of adequate wartime BU system.

[Also, the possibility of requiring additional manpower requirements. Refer to paragraph 31 above.]

41. Ordinal ranking of this CSS E/I by the CSS DCD.

42. Cardinal ranking of this CSS E/I by the CSS DCS.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities. N/A.

44. Remarks. None

45. Data Sources. MAJ Haley Windham, AMEDDC&S, DSN: 471-2433.

1. Title. Test Equipment Modernization (TEMOD).

2. Designation. FXXI CSS Enabler.

Fielding TMOD will cause reductions in quantities of required TMDE, thereby offsetting the heretofore unresourced requirement to reduce the logistics footprint. Designed to replace 2500 makes and models with 60 to 70 COTS/NDI items of test equipment.

a. Description: The objective of the TEMOD program is to deliver state of the art, COTS, general purpose TMDE to the soldier. EMOD minimizes the proliferation of special purpose TMDE, increases alignment accuracy, lessens the footprint of TMDE, and improves interoperability, maintainability, functionality, and standardization of the Army's test equipment.

b. Characteristics: There are currently nine active TEMOD procurement initiatives.

c. Requirement/Need/Mission: A requirement exists to continually replace the Army's aging test equipment while at the same time preventing the proliferation of non standard special purpose TMDE. State of the art TMDE is required to support the Army's complex combat systems.

d. Milestones: Status varies from project to project. The total program costs averages \$10M per year.

3. DTLOMS Area.

a. Primary: Materiel.

b. Secondary: None

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Both.

Replaces multiple makes and models of general purpose COTS test equipment with a reduced number of makes and models.

5. CSS BOS Function.

a. Primary: Fix.

b. Secondary: Distribute.

Mainly sustainment functions.

6. FXXI Priority. Unknown.

[SME did not know the priority for TEMOD as it relates to FXXI maintenance.]

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. High.

[Test Equipment Modernization was prioritized 3 17 out of 51 items. Also, it was prioritized #7 out of 21 Ordnance items.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed.

[SME responded that TEMOD did not make the TRADOC WFLA priority listing.]

9. The 1996 US Army Modernization Plan. Reviewed.

[Page I-16 of this Plan in the Core Support section discusses test equipment modernization. It indicates that "...This program is rated "Red" for the near-term (FY 96-98), "Amber" for the mid-term (FY 99-01) and "Red" for the far-term (FY 02-11) because only 25% of the total force requirements are met. Current antiquated automated test equipment in the field continues to impede effective maintenance programs."]

10. Prerequisite(s).

a. FXXI E/Is. None.

b. Other prerequisites. None.

11. Overall risk status of

a. Prerequisite E/Is. N/A.

b. Other prerequisites. N/A.

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. N/A.

b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? None.

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? Specify.

[SME responded "Enhanced readiness of the Army's major weapon systems. Retirement of existing obsolete test equipment." Some of these weapon systems may likely be designated FXXI initiatives/enablers.]

16. Supporting analytical studies. Yes.

DA TMDE Action Team Assessment 82 identified the need to modernize currently fielded test equipment. DA Battlefield Development Plan 84 identified the need to stop test equipment

proliferation. Under Secretary of Defense issued a 29 Apr 94 DOD Policy for Automatic Test Systems.

[SME indicated that the above references indicated that TMOD is cost effective when compared to the current basecase proliferation of test equipment. However, the SME did not indicate the extent to which these references were truly "analytical" studies.]

17. Changes in manpower requirements caused by fielding this given CSS E/I. None.

18. Related changes in CSS efficiency. Increase.

Reduced time to diagnose and repair. Elimination of unsupportable test equipment.

19. Related changes in CSS effectiveness. Increase.

Fielding of TEMOD items will allow for greater accuracy and quicker fault diagnosis/repair of selected components. This in turn will increase the operational availability of supported weapon systems.

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I Itself).  
Decrease.

[SME responded with a "N/A." However, another CASCOM SME acting on behalf of the Chief of Ordnance indicated that TEMOD was being declared an enabler (and not an initiative) since "...TEMOD-will cause reductions in quantities of required TMDE throughout the Army...designed to replace 2500 makes and models with 60 to 70 COTS/NDI." This study team elected to assign a "Decrease" to this question.]

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. N/A.

No separate concept required. Will utilize existing/emerging maintenance doctrine.

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. Yes.

Generic MNS used (for all TEMOD. Various ROC, ORD and BOIP are approved or in development. TEMOD encompasses many makes and models of equipment.

b. ORD. Yes.

[See above SME response.]

c. BOIP. Yes.

BOIP/TOTAL REQUIREMENT: The TEMOD authorization is generally a one for one or one-for-many replacement for existing obsolete TMDE.



23. CSS E/I training in TRADOC schools. Yes.

24. Examined in

a. TF XXI AWE (Mar 97). No.

b. TRAC's Div Design Analysis Study. No.

c. The Nov 97 DAWE. No.

25. Tested elsewhere. Yes.

Components are evaluated during a user "facility of use assessment." Time and location vary from item to item. None scheduled at present.

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. Yes. Funding exists in the FY 98-03 POM and the EPP. TEMOD has one POM line for all equipment.

PROGRAM FUNDING: MDEP: MT1G. SSN: BZ5269. The estimated cost per unit varies from project to project.

27. Planned BOIP (connectivity between FP). Unknown.

[SME responded "Not Relevant." However, paragraph 22 reads "The TEMOD authorization is generally a one for one or one for many replacement for existing obsolete TMDE." Also, the SME response to question 26 above concerning funding did not indicate if sufficient funds will be available to field new TEMOD to "all" of the FP. Therefore, this study team elected to assign an "Unknown."]

28. Technical capabilities. Proven.  
COTS/NDI.

29. LIA's 15 elements of ILS assessment. Not Assessed.

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). Unknown

[For this question the SME responded with a "N/A." In his TEMOD description provided in paragraph 2 above, the SME also responded, "A requirement exists to continually replace the Army's aging test equipment while at the same time preventing the proliferation of non standard special purpose TMDE. State of the art TMDE is required to support the Army's complex combat systems." It seems reasonable to assume that some of the new TEMOD would be fielded to the First Digitized Division. But the aforementioned funding information lacks specificity to be able to state that the First Digitized Division will receive any/all its required TEMODs by FY 2000. Given the information as provided by the SME, this study team thinks that an "Unknown" is more appropriate.]

b. In time for the First Digitized Corps (2006). Unknown.

[As with the above question, the SME responded with a "N/A." However, this study team again thinks that an "Unknown" is more appropriate, for reasons similar to the above.]

c. During FY 07-10. Unknown

[As with the above questions, the SME responded with a "N/A." However, this study team again thinks that an "Unknown" is more appropriate, for reasons similar to the above.]

31. Overall Peacetime (Programmatic) risk. Amber.

[a. SME stated that "...TRADOC had identified a large number of Personnel Staff Years (PSY) to continue the TEMOD requirements determination process. However, the TEMOD area continues to lose combat development staff officers without sufficient replacements. Therefore, the TEMOD program is in jeopardy. Risk is "Amber" and could go to "Red."

b. The SME did not address lack of funds as the reason for assigning an "Amber" peacetime risk. However, the 1996 Army Modernization Plan (refer to paragraph 9 above) reads, "...This program is rated "Red" for the near-term (FY 96-98), "Amber" for the mid-term (FY 99-01) and "Red" for the far-term (FY 02-11) because only 25% of the total force requirements are met. Current antiquated automated test equipment in the field continues to impede effective maintenance programs, funds may not be sufficient for the entire TEMOD program." This and the lack of specificity in funding information as provided by the SME in paragraph 26 above tends to lead this study team to think that funding could also be a contributor to an "Amber" rating.]

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.

RAM is good since we are using proven COTS technology. Threat is no worse than the threat to which any given maintenance unit will be exposed.

33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation. N/A.

34. Wartime backup (BU) system. In most cases TEMOD will be replacing existing test equipment, in some case one-for-one.

[BU systems would likely be similar in nature as for existing test equipment; i.e., use of a like piece of test equipment, or perhaps use of test equipment from say another maintenance.]

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. None.

[SME responded with a "None." This study team at first thought that a "Low" impact might be appropriate. However, lacking any detailed knowledge as to the quantities of existing/planned test equipment that may be made available for BU systems, this study team agreed with the SME's "None" response.]

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. N/A.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Low.

[SME responded "Not relevant." However, this study team subjectively assigned a "Low" response if funding does not permit fielding new TEMOD to all of the FP. Units without the new test equipment would not enjoy the efficiencies provided by newer state-of-the-art equipment. This in turn could in some way adversely affect supported weapon system availability rates.]

38. Other adverse wartime impacts (e.g., scenario dependent). None

[SME responded with an "Unknown." Granted, some impacts could remain "unknown" (in the purest/philosophical sense) forever, only until a war is fought in a given theater/scenario thereby permitting us to "truly know" the limitations of our equipment. However, this study team thinks that a "None" response may be more appropriate.]

39. Overall wartime risk associated with employment of this CSS E/I. Green.

40. Overall risk (considering both programmatic and wartime risks). Amber

[SME responded that the "overall risk is 'Amber' at best, due to the peacetime risk issues discussed above."]

41. Ordinal ranking of this CSS E/I by the CSS DCD.

42. Cardinal ranking of this CSS E/I by the CSS DCD.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities.

44. Remarks. None

45. Data Sources. MAJ Mabry, CASCOM (DCD-Ord Dir), DSN: 687-0342). CASCOM Sep 96 CSSMMP and related May 97 updates.

1. Title. Transportation Coordinator's Automated Information-  
for Movements System II (TC AIMS II).

2. Designation. FXXI CSS Initiative.

a. Description: TC AIMS II will be an aggregation of the USAF Cargo Movement Operations System (CMOS) and Air Transportation Command and Control System (ATCCS), the USA Transportation Coordinator Command and Control Information System (TCACCIS), the Air Movement Flow Table (AMFT), and Department of the Army Movements Management System-Redesign (DAMMS-R) Block II, the USMC MAGTF Deployment Support System (MDSS) and Transportation Coordinator's Automated Information for Movement System (TC AIMS), the Air Load Module (ALM), and the Integrated Computerized Deployment System (ICODES).

b. Characteristics: The current disparate systems will be blended together with middleware, giving the user seamless access to the future joint functionality's resident from each of the systems.

c. Requirement/Need/Mission: TC AIMS II is part of the reengineering of the Defense Transportation System (DTS). It will empower the user with the ability to: build automated unit equipment lists from standard retail supply and personnel systems, plan convoys, request convoy clearances, request transportation support from all modes, conduct load (air/sea/rail) planning, model and simulate movements and their operational impact on operational plans, enter equipment into the strategic transportation systems, provide enhanced unit/sustainment intransit visibility data, and execute the day-to-day operations of the Installation Transportation Office/Traffic Management Office (ITO/TMO).

d. Status: The JPMOA unit movements prototype system (TC AIMS II BETA and the CMOS prototypes) were released on 9 November 1996. These prototypes are currently under going review by the user community to determine if they meet user requirements; if found suitable prototypes will be incorporated into modules of TC AIMS II.

3. DTLOMS Area.

a. Primary: Materiel.

b. Secondary: None.

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Both.

5. CSS BOS Function.

a. Primary: Distribute.

b. Secondary: None.

6. FXXI Priority. High.

TC AIMS-II is on the list for the First Digitized Division. Also, TC AIMS-II is critical to the success of Battlefield Distribution (BD), ITV, and Automated Transit Visibility (ATV). TC AIMS-II has its own line on the presidential budget.

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. High.

[CSS C4 (which contains ICS3, of which TC AIMS-II is the transportation sub-component) was prioritized #1 out of 51 items. ICS3 was prioritized #2 out of the 5 sub-components of the CSS C4 entry.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Briefed.

[This study team observed that HQ TRADOC briefing charts (a) indicated that TC AIMS-II was "Green" for having money in the POM or programmed to be in the POM for the "First Division Equivalent" by FY 2000 or before, and (b) recommended an additional \$95.7M by FY 00, and additional \$210M by FY 03, and an additional \$TBD by FY 06 for ICS3. The briefing indicated "Plus-up equips 2 Divisions and connectivity, then fills FP 1 and FP 2 without break in production." However, given that the SME indicated that TCAIMS-II is the transportation sub-component of the ICS3, this study team does not know if the referenced WFLA funding recommendations specifically supported TC AIMS-II (or, the recommendations may have been only for the other ICS 3 sub-components to the exclusion of the TC AIMS-II).]

9. The 1996 US Army Modernization Plan. Reviewed.

[This study team could not specifically find reference to TC AIMS-II in this Plan. However, other capstone programs such as the STAMIS Computer Platform and the TDP were in fact rated by this Plan. They received the following ratings. (a) STAMIS: Amber across the complete review years of FY 96-11 due to "...procurement limitations extending the optimum five year replacement cycle to eight years. Increased funding will allow the five year cycle, and the whole program would be rated Green." (b) Amber across the complete review years of FY 96-11, due to "...Execution of the program will be extended in the FY 97-01 period due to significant funding decrements. The Army will not be able to provide key links in the communication network extending the TAV capability to the tactical logistician. if funding is restored, the program will be rated "Green." This study team assumes that TC AIMS-II is covered by one of the above two programs.]

10. Prerequisite(s).

a. FXXI E/Is. None.

b. Other prerequisites. CS.

TC AIMS-II does require communications linkages both in tactical and garrison environments.

11. Overall risk status of

a. Prerequisite E/Is. N/A.

b. Other prerequisites. Unknown.

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. N/A.

b. The other prerequisites. None.

[If TC AIMS-II were not to be fielded, requisite communications linkages both in tactical and garrison environments would suffer no adverse impacts, as the "linkages" would either not be needed or their transmission workload would be lessened accordingly.]

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? None.

[In response to question 6 above, the SME answered that "TC AIMS is critical to the success of BD, ITV, and ATV." Note: CASCOM specifically did not identify BD, ITV and TAV as candidates for being labeled FXXI CSS initiatives/enablers. This study team thinks that these latter systems would benefit from TC AIMS. However, since they are not declared FXXI CSS enablers/initiatives, this study team elected to assign a "None."]

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? Specify.

[For this response, the SME answered " ICS3, MTS, RF and the (Defense Transportation Tracking System (DTTS)... Without the TC AIMS II, these would remain stovepiped relative to transportation. No seamless integrated transportation system." This was based on SME judgment and OSD analysis for Defense Tracking System (DTS) strategy.

16. Supporting analytical studies. None.  
None are available.

17. Changes in manpower requirements caused by fielding this given CSS E/I. None.

[Based on SME-MJ.]

18. Related changes in CSS efficiency. Increase.

[Based on SME-MJ.]

19. Related changes in CSS effectiveness. Increase.

[Based on SME-MJ.]

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself).  
Increase.

TC AIMS-II may add computers at the company level where they did not exist unless the software is loaded on the ULLS-S4 hardware. This decision is yet to be made.

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Not Developed.

(As of Apr 97) concept was still yet to be drafted by the CASCOM (DCD-Trans Dir).

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. No

MNS drafted and staffed. Approval pending at US TRANSCOM.

b. ORD. No.

ORD drafted and staffed. Approval pending at US TRANSCOM.

c. BOIP. No.

Not yet. The BOIP has been drafted for submission to higher headquarters...

TC AIMS II will be the system for Unit Movement Officers (UMO) and staff officers from company to theater level, Unit Movement Coordinators (UMC), and Installation Transportation Offices, TC AIMS II will be a DOD-standard system for garrison and deployment operations in peace or war.

23. CSS E/I training in TRADOC schools. No.

24. Examined in

a. TF XXI AWE (Mar 97). No.

b. TRAC's Div Design Analysis Study. No.

c. The Nov 97 DAWE. No.

25. Tested elsewhere. No.

[As of the end of Apr 97, SME indicated that TC AIMS-II had not yet been tested. However, the Beta version of TC AIMS-II was scheduled to be tested in Jun 97 at FT Eustis and at FT Hood in Aug 97.]

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. No.

[SME indicated in Apr 97 that (a) TC AIMS-II is in the FY 98-03 POM as an unfinanced requirement. (b) TRADOC will be the bill payer for TC AIMS-II after FY 98. (c) TCAIMS-II is DA funding priority #90. This study team does not know if (a) such a priority is high or low, or (b) if this unfinanced requirement covers the possibility of placing TC AIMS II computers into company level units- refer to paragraph 20a above "...TC AIMS-II may add computers at the company level where they did not exist unless the software is loaded on the ULLS-S4 hardware. This decision is yet to be made."]

27. Planned BOIP (connectivity between FP). Yes.

Plans call for fielding TC AIMS-II to all four FP at the company level and higher.

28. Technical capabilities. Proven.

Based on SME-MJ because TC AIMS-II is an aggregation of existing systems integrated into one.

29. LIA's 15 elements of ILS assessment. Unknown.

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). Yes.  
IOC 4th QTR FY 98 and FOC 4th QTR FY 00.

b. In time for the First Digitized Corps (2006). Yes.

c. During FY 07-10. N/A.  
Expect complete fielding before FY 2007. Actual fielding schedule still being developed.

31. Overall Peacetime (Programmatic) risk. Amber.

[During the interview with the CASCOM TC AIMS-II SME, this study team was provided a response of "Amber" due to the uncertainty of adequate funding.]

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.

[SME responded "Yes, if hardware fails at any node, a portion of the network will be down but will not prevent other users from operating. Communications failures will inhibit data from moving through the network. Susceptible to jamming interference and interception." Based on this response, this study team assigned a "Low."]

33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation. N/A.

[SME responded "N/A" as it relates to any prerequisite "E/Is." However, with reference to question 10b above "TC AIMS-II does require communications linkages both in tactical and garrison



environments", this study team has no information related to the likelihood of battlefield communication linkages (in support of TC AIMS-II) being degraded.]

34. Wartime backup (BU) system. Manual processes would become the BU system.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available.  
N/A.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available.  
Low.

[SME responded "Green, but ITV and TAV would be lost while the system is down. All other processes could be completed with manual processes with degradation of efficiency." Based on the SME response, this study team assigned a "Low."]

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Medium.  
Incomplete fielding would lead to an incomplete network. This would impact information visibility and data transfer. This could impact the commander's decision making process.

[Based on the above SME response this study team assigned a "Medium" answer.]

38. Other adverse wartime impacts (e.g., scenario dependent). None.

39. Overall wartime risk associated with employment of this CSS E/I. Green.

40. Overall risk (considering both programmatic and wartime risks). Amber

[Based on paragraph 31 above.]

41. Ordinal ranking of this CSS E/I by the CSS DCD.

42. Cardinal ranking of this CSS E/I by the CSS DCD.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities.

44. Remarks. None

45. Data Sources. CPT Roberts, CASCOM (ISD), DSN: 687-1352. TC AIMS-II draft fact sheet for the CASCOM 1997 CSSMMP.

1. Title. Unit Ministry Team (UMT)

2. Designation. FXXI CSS Initiative.

a. Definition: The UMT initiative built itself upon a digital communications prototype known as appliqué. The UMT provides the commander's religious support program to soldiers. The tempo of Force XXI operations, combined with the need for synchronization, requires the UMT to field appliques in order to render services to soldiers and professional support to command and staff. UMT represent the core values of our Army and our society, and consequently have an intangible impact on the morals, morale and welfare of command. Their presence on the battlefield builds and sustains the character of soldiers.

b. The UMT consists of at least one chaplain and one chaplain assistant assigned to battalion and brigade, equipped with one HMMWV, one appliqué, one SINGARS, one Global Positioning System (GPS), and one EPLRS, in order to provide comprehensive seamless Unit Ministry on the battlefield.

c. APPLIQUE: A system consisting of a hardware/software suite that digitizes C2 at BDE and below. This initiative requires UMT to be equipped w/ appliqué computers in order to provide better situational awareness of unit locations and needs, thus enabling the UMT to provide seamless religious support across the entire battlefield.

Personnel/equipment requirements for the division.

Current:	Need: (in addition to current equip/pers)
Team 1:	Team 3:
1/56A/O5	1/56A/O4
1/71M/E8	1/56A/E7
1 HMMWV	1 HMMWV
1 Appliqué	1 Appliqué
1 SINGARS	1 SINGARS
1 EPLRS	1 EPLRS
1 GPS (PLGR)	1 GPS (PLGR)
Team 2:	Team 4:
1/56A/O4	1/56A/O4
1/71M/E4	1/71M/E6
1 HMMWV	1 HMMWV
1 Appliqué	1 Appliqué
1 SINGARS	1 SINGARS
1 EPLRS	1 EPLRS
1 GPS (PLGR)	1 GPS (PLGR)

[It should be noted that the SME wanted to break this initiative into two Phases. Phase I consists of the current UMT personnel in the division using their current HMMWV and radios, but they will need FBCB2-CSS Functionality and GPS. *Phase II consists of the extra personnel* also using extra HMMWV, radios, FBCB2-CSS Functionality, and GPS.]

3. DTLOMS Area.

a. Primary: Organization.

b. Secondary: None.

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Both.

5. CSS BOS Function.

a. Primary: Man.

b. Secondary: None.

6. FXXI Priority. High.

Per the Chief of Chaplains Office, HQDA and the Chief of Chaplains, FT Jackson, SC.

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. N/A.

[This plan focused on Materiel items.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed.

9. The 1996 US Army Modernization Plan. Not Reviewed.

10. Prerequisite(s).

a. FXXI E/Is. CSS.

FBCB2- CSS Functionality is critical in order for unit ministry personnel to know the soldier's religious denomination.

b. Other prerequisites. CS.

UMT needs communications such as GPS, SINGARS etc. Paragraph 2b above reads "...equipped with one HMMWV, one appliqué, one SINGARS, one GPS, and one EPLRS, in order to provide comprehensive seamless Unit Ministry on the battlefield."

11. Overall risk status of

a. Prerequisite E/Is. Medium.

Refer to FBCB2-CSS Functionality CEFA assessment).

b. Other prerequisites. Unknown.

[This study team does not know the risk related to battlefield availability of GPS, SINGARS etc. to the UMT initiative.]

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. None.

Failure to field the UMT will not adversely impact the FBCB2-CSS Functionality initiative.

b. The other prerequisites. None.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? None.

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? None.

16. Supporting analytical studies. Unknown.

17. Changes in manpower requirements caused by fielding this given CSS E/I. Increase.

For Phase II, we will need an increase of 2 UMT (two extra personnel per each team for a total of four personnel) at the Division level in order to perform split-based as well as 24 hour operations.

18. Related changes in CSS efficiency. Increase.

This will increase the timeliness of religious support and accuracy of reporting, and allow more time for direct religious support to soldiers.

19. Related changes in CSS effectiveness. Increase.

This will provide more religious support to the soldier.

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself). None.

[It should be noted that this initiative "as defined" for the Phase II part requires extra HMMWV, each with appliqué devices and GPS. Otherwise, this study team would have generally assigned an "Increase" for this response, primarily due to the added requirements (and funding) for the HMMWV, applique and GPS devices- as necessitated by Phase II.]

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Developed.

Approved by Chief of Chaplains, 1997.

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. N/A.

UMT initiative is an organizational change.

b. ORD. N/A.

c. BOIP. N/A.

23. CSS E/I training in TRADOC schools. No.  
Not yet.

24. Examined in

a. TF XXI AWE (Mar 97). Yes.

[SME indicated that "Concept validated at TF XXI AWE." However, this study team received no additional TF XXI results concerning this initiative.]

b. TRAC's Div Design Analysis Study. No.

c. The Nov 97 DAWE. Yes.

The UMT initiative is CS01 item of analysis for the DAWE.

25. Tested elsewhere. No.  
Other than in TF XXI AWE.

[Results were not available for review by this study team.]

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. Unknown.

[The SME did not know if money is programmed for the extra applique (FBCB2-CSS Functionality) and GPS devices for both Phases I and II, or for the extra HMMWV (and their required FBCB2-CSS Functionality and GPS) for Phase II. Thus, this study team assigned an "Unknown" response.]

27. Planned BOIP (connectivity between FP). Yes.  
Plans call for fielding this initiative to all four FP.

28. Technical capabilities. Proven.

[SME indicated that the capabilities of using appliqué and GPS in support of the UMT were proven at the TFXXI AWE.]

29. LIA's 15 elements of ILS assessment. N/A.

30. Fielding schedule.

- a. In time for the First Digitized Div (Sep 2000). Unknown.

[SME indicated "Planned for the First Digitized Division." However, this study team assigned an "Unknown" until resolution is obtained concerning availability of (1) funds for the UMT equipment, and (2) the extra manpower needed for Phase II of this initiative.]

- b. In time for the First Digitized Corps (2006). Unknown.

- c. During FY 07-10. Unknown.

31. Overall Peacetime (Programmatic) risk. Red.

[SME stated that UMT Phase I (refer to paragraph 2 above) was rated "Amber" due to its dependence on the FBCB2-CSS Functionality risk. Note that (a) CEFA assessed the risk for FBCB2-CSS Functionality as "Amber," and (b) this study team could find no information which indicated that sufficient funds have been programmed (1) to place FBCB2-CSS Functionality and GPS into even the UMT Phase I HMMWV, and (2) to buy the HMMWV (and FBCB2-CSS Functionality and GPS) needed for UMT Phase II.

The SME himself rated UMT Phase II as "Red" due to uncertainties around funding for the extra HMMWV, the extra appliqué and GPS devices-as well as the increase in manpower requirements (even though these equipment items are defined to be "part of this initiative"). Until the possible funding issue around placing FBCB2-CSS Functionality and GPS into even the Phase I HMMWV is resolved, this study team elected to assign an overall peacetime rating of "Red."]

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.

Threat will be the same as the supported force.

33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation.

Low.

[CEFA rated FBCB2-CSS Functionality as "Low" for this aspect of wartime employment.]

34. Wartime backup (BU) system. No BU system is planned or deemed adequate by the SME. Use of current procedures severely lacks the situational awareness needed on the FXXI battlefield.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. High. Loss of religious situational awareness would severely degrade the providing of timely religious support to soldiers. Also, the ability to perform split-based and 24 hour operations would be severely degraded.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. N/A.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. High.

Some units would not be able to provide timely and adequate religious support. Also, the ability to perform split-based and 24 hour operations would be severely degraded for those units not receiving this UMT initiative.

38. Other adverse wartime impacts (e.g., scenario dependent). N/A.

39. Overall wartime risk associated with employment of this CSS E/I. Amber.

[SME felt that there will be no adequate BU system, and that therefore there will always be some wartime risk.]

40. Overall risk (considering both programmatic and wartime risks). Red.

[Due to the aforementioned overall peacetime risk.]

41. Ordinal ranking of this CSS E/I by the CSS DCD.

42. Cardinal ranking of this CSS E/I by the CSS DCD.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities. N/A.

44. Remarks. None.

45. Data Sources. MAJ (Chap) Payton, CASCOM (DCD-CSS Dir), DSN: 687-2170.

1. Title. Vehicle Integrated Multiple Power Source (VIMEPS).

2. Designation. FXXI CSS Initiative.

a. Description: VIMEPS is a combination alternator capable of providing dual power sources, simultaneously. It will produce 24 DC volts to operate equipment and charge batteries and 110 or 220 AC volts to operate auxiliary or attached equipment; such as, computers, GPS's, medical equipment, tools and early entry equipment. VIMEPS can be configured to produce 5 kW of AC voltage while simultaneously producing 100, plus, amperes of 24 DC voltage. VIMEPS will generate dual sources of power on the move or in a stationary location, whenever the vehicle is in operation. The configuration shown above replaces the vehicle alternator, but it can be configured to mount in the traditional flywheel location, and perform a starter function, or it can be mounted in-line.

b. Benefits: VIMEPS provides an efficient means to generate vehicle power, compared to traditional vehicles alternators; reducing O&S costs associated with battery re-charging. VIMEPS is capable of charging lead acid, NiCad or NiMH batteries. VIMEPS will eliminate our dependency on small inefficient generators and Auxillary Power Units (APU), while providing immediate access to electrical power. VIMEPS technology can be applied to any equipment in the Army's inventory; initially the application of this technology will be tested in command and maintenance vehicles (HMMWV configuration).

c. Cost: VIMEPS will cost 100K to test 25 prototype units with a total rated output of 5 kilowatts per unit, with limited follow-on engineering support. Estimated production cost is \$1900-\$2300 per unit. Estimate basis of issue to command, medical and maintenance HMMWV's at 42,000.

d. Current Status: Currently, VIMEPS is an unfunded program. VIMEPS is a FY 98 CEP candidate.

3. DTLOMS Area.

a. Primary: Materiel

b. Secondary: None.

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Modernization.

Vehicles will be equipped with the ability to have both AC and DC power on-board their vehicles to operate tools, etc.

5. CSS BOS Function.

a. Primary: Fix

b. Secondary: None



6. FXXI Priority. High.

Very high per the Deputy Chief of Staff for Logistics at the NTC.

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. None

[Not addressed in this plan.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed.

9. The 1996 US Army Modernization Plan. Not Reviewed.

10. Prerequisite(s).

a. FXXI E/Is. None.

VIMEPS is stand alone technology.

b. Other prerequisites. None.

VIMEPS is stand alone technology.

11. Overall risk status of

a. Prerequisite E/Is. N/A.

b. Other prerequisites. N/A.

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. N/A.

b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? None.

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? None.

16. Supporting analytical studies. None

Still under evaluation by TACOM-expect results by Aug 97.

17. Changes in manpower requirements caused by fielding this given CSS E/I. None.

18. Related changes in CSS efficiency. Increase.

Yes, provides electrical power as an integrated asset of the vehicle. VIMEPS provides an efficient means to generate vehicle power, compared to traditional vehicles alternators; reducing O&S costs associated with battery re-charging. VIMEPS is capable of charging lead acid, NiCad or NiMH

batteries. VIMEPS will eliminate our dependency on small inefficient generators and APU's, while providing immediate access to electrical power. VIMEPS technology can be applied to any equipment in the Army's inventory; initially the application of this technology will be tested in command and maintenance vehicles (HMMWV configuration).

19. Related changes in CSS effectiveness. Increase.

VIMEPS will generate dual sources of power on the move or in a stationary location, whenever the vehicle is in operation.

[This will increase the effectiveness of the mechanic and may result in higher weapon systems availability rates.]

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself). None.

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Developed.

Part of the Ordnance Vision XXI which itself is still under development.

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. N/A.

None needed due to the items low cost.

b. ORD. Unknown

Need for an ORD is TBD.

c. BOIP. No

BOIP not yet developed.

23. CSS E/I training in TRADOC schools. No.

Not yet, too early in its development cycle.

24. Examined in

a. TF XXI AWE (Mar 97). No.

b. TRAC's Div Design Analysis Study. No.

c. The Nov 97 DAWE. No.

25. Tested elsewhere. No.

But is projected as a FY 98 CEP.

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. No. Has not been submitted-still requires testing.

27. Planned BOIP (connectivity between FP). Unknown.

28. Technical capabilities. Proven.

Proven only in the commercial world. This item will be a NDI using COTS technology.

29. LIA's 15 elements of ILS assessment. Not Assessed.  
None done yet on the VIMEPS.

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). Unknown.  
VIMEPS is still under development.

b. In time for the First Digitized Corps (2006). Unknown.  
VIMEPS is still under development.

c. During FY 07-10. Unknown.  
VIMEPS is still under development.

31. Overall Peacetime (Programmatic) risk. Amber.  
Needs Army field testing and needs funding.

[Given the above and the uncertainty surrounding a possible need for an ORD, this study team would have assigned a "Red" except for the fact that VIMEPS has a developed concept and plans to use already proven COTS technology.]

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.  
We are using proven COTS technology. Threat would be the same as any using unit.

33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation. N/A.

34. Wartime backup (BU) system. There will be no planned BU system for an inoperative VIMEPS other than replacement its replacement by another VIMEPS.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available. N/A.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available. Low.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Medium.

[The SME responded "Minimal." However, this study team thinks that if the VIMEPS is only fielded to selected vehicles, then several adverse issues arise: (a) we will have to stock the

VIMEPS as well as the current alternators (granted, this dual stocking will have to continue until the older using vehicles phase out). (b) Vehicles not receiving the VIMEPS will then not realize the same expected increases in efficiencies/effectiveness. This in turn could place them at a disadvantage when operating say in a combined Task Force where some other units/vehicles have the VIMEPS. Therefore, this study team assigned a "Medium" response.]

38. Other adverse wartime impacts (e.g., scenario dependent). None.

39. Overall wartime risk associated with employment of this CSS E/I. Green.

40. Overall risk (considering both programmatic and wartime risks). Amber

[Refer to paragraph 31 above.]

41. Ordinal ranking of this CSS E/I by the CSS DCD.

42. Cardinal ranking of this CSS E/I by the CSS DCD.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities. N/A.

[VIMEPS was not reviewed in this plan.]

44. Remarks. None.

45. Data Sources. CW3 Slaughter, CASCOM (DCD-Ord Dir), DSN: 687-0595.

1. Title. Warfighter Physiological Status Monitor (WPSM)

2. Designation. FXXI CSS Initiative.

Description;

a. WPSM will provide a seamless transition from Force Protection to Combat Casualty Care. Its desired capabilities include medical readiness, warning of impending physiologic problems, minimal motion determination, early triage, and seamless hand-off to combat casualty care. To execute these capabilities, physiologic measurements will need to focus on common threats to mission effectiveness such as wounding, cold/heat stress, fatigue, sleep deprivation, dehydration, psychological stress, circadian rhythm, and acclimatization.

b. As a sub-component of the Land Warrior (LW), the WPSM is a computerized monitoring device used to capture vital medical signs of individual soldiers. It will have a transmitter/receiver linked into the LW's normal communications network. When specific readings exceed normal thresholds, a signal will be sent back to a central monitoring station where medical help can be dispatched as required.

3. DTLOMS Area.

a. Primary: Materiel.

b. Secondary: Soldiers.

4. CSS E/I Type (Digitization/Modernization (D, M, Both)). Both.

5. CSS BOS Function.

a. Primary: Man.

b. Secondary: None.

6. FXXI Priority. Unknown.

[WPSM is a sub-component of the LW. LW's FXXI priority is unknown to the AMEDDC&S SME and to this study team.]

7. CASCOM's 4 Sep 96 CSS Materiel Master Plan Priority. None.

[WPSM/LW was not listed in this plan.]

8. 31 Jan 97 HQ TRADOC WFLA Recommendations to HQDA ODCSOPS. Not Briefed Refer to Land Warrior. This is Emerging Technology from the Infantry Center and School. This prototype system will execute it's Concept Evaluation Plan in July 1997.

9. The 1996 US Army Modernization Plan. Not Reviewed.

[WPSM was "indirectly" reviewed. AMEDDC&S SME reported that WPSM is a subcomponent of the MC4 system. Page L-9 of Annex L, Combat Health Support indicated that: "...C4I (Command, Control Communications, Computers, and Intelligence) must provide for and manage horizontal and vertical technology insertion into all organizational designs, including MC4." This plan rated medical C4I as Red for the near-term (FY 96-98) because of the increased need for communications and split-base operations for Combat Health Support command and control elements. The Plan related medical C4I as Red for FY 99-11 primarily due to the lack of identified funds. Also, the LW and the 21st Century LW are both rated under the "Digitization" heading on page B-22 as Red (FY 96-98) and Red (FY 99-01) due to the fact such will involve "expensive technology." They are rated Amber (FY 02-11) as "technology becomes more affordable, but concerns over adequate levels of procurement dollars prevent a higher rating (Green).]

10. Prerequisites.

a. FXXI E/Is. C.

The successful fielding and operation of the LW is a prerequisite for WPSM.

[This study team does not have information related to the official list of FXXI Combat enablers/initiatives, but assumes that the LW is designated as a "Combat" FXXI Initiative.]

b. Other prerequisites. None.

11. Overall risk status of

a. Prerequisite E/Is. Unknown.

[The SME did not have information about the risk status of the LW and the integration of the WPSM.]

b. Other prerequisites. N/A.

12. Adverse programmatic (peacetime) risks on

a. The "prerequisite" E/Is if this given CSS E/I is not fielded. Low.

[The LW will continue to be developed/fielded indifferent to the status of WPSM.]

b. The other prerequisites. N/A.

13. What other FXXI E/Is depend on ("require") this given CSS E/I in order to function? None.

14. Adverse programmatic risks on "dependent" E/Is if this E/I is not fielded. N/A.

15. What other FXXI E/Is will "benefit" due to fielding this given CSS E/I? Specify.

[a. MC4 requires the WPSM in order to realize its (MC4) maximum synergistic benefits derived from the collection of patient information from many different sources. WPSM is just one of several (e.g., T-Med, MEDLOG-D, TMIP) medical initiatives that input to the MC4 initiative.

b. Without the WPSM the efficiency/effectiveness of MC4 would be degraded. Manual (Combat Medic/Combat Lifesaver) and time consuming methods would have to be used to capture the data which otherwise would be provided by the WPSM.]

16. Supporting analytical studies. None.  
No analytical studies exist.

17. Changes in manpower requirements caused by fielding this given CSS E/I. None.

18. Related changes in CSS efficiency. Increase.

SME-MJ, with no supporting data. A CEP will be conducted in Jul 97 at Ft Benning. Efficiencies will be realized by having the ability to be able to determine ahead of time and from a centralized location if a soldier is getting ill or has been injured (and the severity of such injury). With WPSM they may be able to stop a soldier from becoming ill, e.g., if the WPSM detected that he was beginning to suffer from heat injuries.

19. Related changes in CSS effectiveness. Increase.

More lives will be saved, and Combat Medics will be used more effectively from a centralized location.

20. Related force structure (equipment and/or organizational) changes.

a. In equipment (other than the equipment associated with the given CSS E/I itself).  
Increase.

The BN Aid Station will likely require extra equipment to monitor the WPSM signals. This extra equipment could be extra computers, or radios or perhaps even Applique (as part of the FBCB2-CSS Functionality).

b. In organization(s). None.

21. Status of CSS E/I Operational Concept. Unknown.

[SME assumed the existence of a WPSM concept given (a) the upcoming CEP test, and (b) that WPSM is a part of the LW. However, the SME could not locate any related operational concept. Therefore, this study team assigned an "Unknown."]

22. Approved documentation (e.g., MNS, ORD, BOIP).

a. MNS. Yes.

The LW MNS covers the WPSM. Approval date is unknown.

b. ORD. Yes.

The LW ORD covers the WPSM. Approval date is unknown.

c. BOIP. No.

Not yet developed. But, plans call for WPSM to be issued to every soldier. Fielding plans for the extra-required equipment are to-be-determined.

23. CSS E/I training in TRADOC schools. No.

Not yet.

24. Examined in

a. TF XXI AWE (Mar 97). No.

b. TRAC's Div Design Analysis Study. No.

c. The Nov 97 DAWE. No.

25. Tested elsewhere. No.

But, Army Rangers may have "demonstrated" the WPSM at Ft Benning.

26. Funded in (a) Pre FY 98 years, (b) FY 98-03 POM, and (c) EPP FY 04-12. No.

27. Planned BOIP (connectivity between FP). Unknown.

Unofficial plans call for fielding WPSM to every soldier in all FP. Such, however, would be contingent upon adequate funds.

28. Technical capabilities. Unknown.

CEP to begin in Jul 97.

[SME did not know if WPSM-related technology has been proven in the civilian medical sector.]

29. LIA's 15 elements of ILS assessment. Unknown.

[The LW may have been assessed by LIA, but the SME did not know.]

30. Fielding schedule.

a. In time for the First Digitized Div (Sep 2000). Unknown.

b. In time for the First Digitized Corps (2006). Unknown.

c. During FY 07-10. Unknown.

31. Overall Peacetime (Programmatic) risk. Red.



[The SME was unable to assign a Peacetime/Programmatic risk to the WPSM. However, this study team advised him that it would assign a "Red," given no funding, unproven capabilities, an "Unknown" risk associated with fielding WPSM's stated LW prerequisite, and the possibility of increases in equipment at the BN Aid Station level (refer to paragraph 20a above).]

32. Likelihood of CSS E/I performance degradation during wartime due to threat, RAM failure or lack of requisite force structure. Low.  
SME-MJ.

33. Likelihood of prerequisite C, CS or CSS E/I wartime degradation. Unknown.

[SME did not have information on the LW.]

34. Wartime backup (BU) system. A BU system would be the current system consisting of the Combat Medic and the Combat Life Saver, along with other manual "stubby pencil"/sneaker net procedures in order to acquire needed information for passing to the MC4 system.

35. Adverse wartime impact if this CSS E/I is degraded with "NO" BU system available.  
N/A.

36. Adverse wartime impact if this CSS E/I is degraded "WITH" a BU system available.  
Medium.

The loss of selected medical situational awareness/data about a soldier's condition will have an adverse effect on a commander's ability to fight in a dynamic, non-linear FXXI battlefield. We would not fully capitalize on the "Information Dominance" required to win the next generation of warfights. We would not be able to quickly acquire information about combat casualties, and therefore not be able to expedite dispatch of medical treatment to them. Use of the BU system on the planned FXXI battlefield would not be as effective in rendering urgently needed medical care.

37. Adverse wartime impacts due to limited fielding of this given CSS E/I. Medium.  
Those units not receiving the WPSM would have to fight in a FXXI environment with only the aforementioned BU system. Also, automated systems geared for receiving WPSM-derived data would need to have other established sources for such information.

38. Other adverse wartime impacts (e.g., scenario dependent). Unknown.

[SME indicated that such may be predicated on information related to the LW.]

39. Overall wartime risk associated with employment of this CSS E/I. Amber.

[The SME stated that he was unable to assign a WPSM wartime risk rating. Based on the information that the SME did provide, this study team assigned a rating of "Amber." Rationale: Low threat/incidence of expected RAM failures (SME's MJ), but "Medium" adverse impacts expected on the FXXI battlefield given only the planned BU system as discussed above. A more robust BU system would be needed to mitigate this risk to Green.]

40. Overall risk (considering both programmatic and wartime risks). Red.

[SME was not able to assign an overall risk rating. However, this study team assigned an overall rating of "Red" based on the programmatic risk rating- refer to paragraph 31 above.]

41. Ordinal ranking of this CSS E/I by the CSS DCD.

42. Cardinal ranking of this CSS E/I by the CSS DCD.

43. Comparison of rankings to CASCOM CDR's 4 Sep 96 CSS MMP priorities. N/A.

[WPSM was not mentioned in this plan.]

44. Remarks. None

45. Data Sources. MAJ Haley Windham, AMEDDC&S, DSN: 4761-2433.

## LISTING OF ACRONYMS AND TERMS

AA	ABBREVIATED ANALYSIS
AAFARS	ADVANCED AVIATION FORWARD AREA REFUELING SYSTEM
AAN	ARMY AFTER NEXT
AAO	ARMY ACQUISITION OBJECTIVE
AAR	AFTER ACTION REVIEW
ABC	AIRBORNE CORPS
ABCS	ARMY BATTLEFIELD CONTROL SYSTEM
ABOB	AUTOMATED BREAKOUT BOXES
ACALA	ARMY ARMAMENT AND CHEMICAL ACQUISITION AND LOGISTICS ACTIVITY
ACAT III/IV	ACQUISITION CATEGORY
ACT II	ADVANCED CONCEPT TECHNOLOGY II
ADCSOPS	ASSISTANT DEPUTY CHIEF OF STAFF FOR OPERATIONS
ADP	AUTOMATIC DATA PROCESSING
AEPCO	ADVANCED ENGINEERING AND PLANNING CORP., INC.
AFATDS	ADVANCED FIELD ARTILLERY TACTICAL DATA SYSTEM
AFMIS	ARMY FOOD MANAGEMENT INFORMATION SYSTEM
AG	ADJUTANT GENERAL
AGCCS	ARMY GLOBAL COMMAND AND CONTROL SYSTEM
AI	ARTIFICIAL INTELLIGENCE
AIT	AUTOMATED IDENTIFICATION TECHNOLOGY
ALM	AIR LOAD MODULE
AMC	(UNITED STATES) ARMY MATERIAL COMMAND
AMEDD	ARMY MEDICAL DEPARTMENT
AMEDDC&S	ARMY MEDICAL DEPARTMENT CENTER AND SCHOOL
AMEV	ARMORED MEDICAL EVACUATION VEHICLE
AMFT	AIR MOVEMENT FLOW TABLE
AMFT	AUTOMATED MOVEMENT FLOW TRACKING
AMTV	ARMORED MEDICAL TREATMENT VEHICLE
AMV	ARMORED MAINTENANCE VEHICLE
ANSI/ISO	AMERICAN NATIONAL STANDARDS INSTITUTE/INTERNATIONAL STANDARDS ORGANIZATION
AOA	ANALYSIS OF ALTERNATIVES
AOE	ARMY OF EXCELLENCE
APU	AUXILLARY POWER UNIT
AR	ARMOR/ (or) ARMY REGULATION
ARDEC	ARMAMENT RESEARCH DEVELOPMENT CENTER
ARL	ARMY RESEARCH LABORATORY
ARM	ARMY READINESS AND MOBILIZATION

ARPA	ADVANCED RESEARCH PROJECTS AGENCY
ARS	ADVANCED RADIOGRAPHIC SYSTEM
ASARC	ARMY SYSTEMS ACQUISITION REVIEW COUNCIL
ASAS	ALL-SOURCE ANALYSIS SYSTEM
ASC	AMMUNITION SOLAR COVER
ASL	AUTHORIZED STOCKAGE LIST
ASMC	AREA SUPPORT MEDICAL COMPANY
ASP	AMMUNITION SUPPLY POINT
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
ASVAB	ARMED SERVICES VOCATIONAL APTITUDE BATTERY
ATA	ARMY TECHNICAL ARCHITECTURE
ATCCS	ARMY TACTICAL COMMAND AND CONTROL SYSTEM
ATCD	ADVANCED TECHNOLOGY CONCEPT DEMONSTRATION
ATCOM	AVIATION AND TROOP COMMAND
ATLAS	ALL-TERRAIN LIFTER, ARMY SYSTEM
ATP	AMMUNITION TRANSFER POINT
ATTV	ARMORED TREATMENT AND TRANSPORT VEHICLE
ATV	AUTOMATED TRANSIT VISIBILITY
AUTL	ARMY UNIVERSAL TASK LIST
AVIM	AVIATION INTERMEDIATE MAINTENANCE
AWE	ADVANCED WARFIGHTING EXPERIMENT
BAS	BATTALION AID STATION
BBS	BATTALION/BRIGADE SIMULATION
BCT	BRIGADE COMBAT TEAM
BD	BATTLEFIELD DISTRIBUTION
BDAR	BATTLE DAMAGE ASSESSMENT AND REPAIR
BDE	BRIGADE
BDU	BATTLE DRESS UNIFORM
BG	BRIGADIER GENERAL
BFA	BATTLEFIELD FUNCTIONAL AREA
BIT/BITE	BUILT-IN-TEST/BUILT-IN-TEST EQUIPMENT
BN	BATTALION
BOB	BREAKOUT BOXES
BOIP	BASIS OF ISSUE PLAN
BOS	BATTLEFIELD OPERATING SYSTEM
BPS	BALLISTIC PROTECTIVE SYSTEM
BSA	BRIGADE SUPPORT AREA
BSTF	BASE SHOP TEST FACILITY
BTU	BRITISH THERMAL UNIT
BU	BACK UP
C	COMBAT
C&GSC	COMMAND AND GENERAL STAFF COLLEGE
C2	COMMAND AND CONTROL
C2V	CONTROL AND COMMAND VEHICLE
C4	COMMAND, CONTROL, COMMUNICATIONS AND COMPUTER

C4RDP	COMMAND, CONTROL, COMMUNICATIONS AND COMPUTER (C4) REQUIREMENTS DEFINITION PROGRAM
C4I	COMMAND, CONTROL, COMMUNICATIONS, COMPUTERS, AND INTELLIGENCE
CAA	CONCEPT ANALYSIS AGENCY
CAC	COMBINED ARMS COMMAND
CALL	CENTER FOR ARMY LESSONS LEARNED
CALS	COMPUTER-AIDED ACQUISITION AND LOGISTICS SUPPORT
CASCOM	COMBINED ARMS SUPPORT COMMAND
CASCOM-ISD	COMBINED ARMS SUPPORT COMMAND- INFORMATION SYSTEMS DIRECTORATE
CASI	COMBAT SERVICE SUPPORT AUTOMATED INFORMATION SYSTEMS INTERFACE
CAV	CAVALRY
CBC	CARGO BED COVERS
CBT	COMMON BRIDGE TRANSPORTER
CD	COMPACT DISK
CDR	COMMANDER
CEFA	COMBAT SERVICE SUPPORT ENABLER FUNCTIONAL ASSESSMENT
CEP	CONCEPT EXPERIMENTATION PROGRAM
CHCS	COMBAT HEALTH CARE SYSTEM
CHLS	COMBAT HEALTH LOGISTICS SYSTEM
CHS	COMMON HARDWARE AND SOFTWARE/ (or) COMBAT HEALTH SUPPORT
CHU	CARGO HANDLING UNIT
CINC	COMMANDER-IN-CHIEF
CK	CONTAINERIZED KITCHEN
CL	CLASS (OF SUPPLY)
CLV	CONTRACTOR LOGISTICS VENTURE
CMF	CAREER MANAGEMENT FIELDS
CMOS	CARGO MOVEMENT OPERATIONS SYSTEM
CMT	CONTACT MAINTENANCE TRUCK
COBRA	(Proper name for type of Army helicopter)
COE	COMMON OPERATING ENVIRONMENT
COEA	COST AND OPERATIONAL EFFECTIVENESS ANALYSIS
COMPO	COMPOSITION OF FORCE - 1 (ACTIVE DUTY), 2 (NATIONAL GUARD), 3 (ARMY RESERVES, 4 (UNRESOURCED REQUIREMENTS)
CONUP	CONTINUOUS OPERATIONS PLAN
CONUS	CONTINENTAL UNITED STATES
COTS	COMMERCIAL-OFF-THE-SHELF
CPO	CIVILIAN PERSONNEL OFFICE
CPT	CAPTAIN

CPU	CENTRAL PROCESSING UNIT
CROP	CONTAINER ROLL IN/ROLL OUT PLATFORM
CS	COMBAT SUPPORT
CSA	CHIEF OF STAFF, U. S. ARMY
CSH	COMBAT SUPPORT HOSPITAL
CSMU	CRASH SURVIVABLE MEMORY UNIT
CSS	COMBAT SERVICE SUPPORT
CSSAMO	COMBAT SERVICE SUPPORT AUTOMATION MANAGEMENT OFFICE
CSSCS	COMBAT SERVICE SUPPORT CONTROL SYSTEM
CSSL	CONTAINERIZED SELF SERVICE LAUNDRY
CSSMMP	COMBAT SERVICE SUPPORT MODERNIZATION MASTER PLAN
CTA	COMMON TABLE OF ALLOWANCE
CTASC	CORPS/THEATER ADP SERVICE CENTER
CTIS	CENTRAL TIRE INFLATION SYSTEM
CTS	CONTACT TEST SET
CUCV	COMMERCIAL UTILITY CARGO VEHICLE
D	DOCTRINE
DLA	DEFENSE LOGISTICS ACTIVITY
DA	DEPARTMENT OF THE ARMY
DAMMS-R	DEPARTMENT OF THE ARMY MOVEMENTS MANAGEMENT SYSTEM-REDESIGN
DAMPL	DEPARTMENT OF THE ARMY MASTER PRIORITY LIST
DAWE	DEPARTMENT OF THE ARMY WARFIGHTING EXPERIMENT
DBFS	DEFENSE BATTLEFIELD FINANCE SYSTEM
DCA	DATA CONNECTOR ASSEMBLY
DCD	DIRECTOR OF COMBAT DEVELOPMENTS
DCS	DEFENSE COMMUNICATIONS SYSTEM
DCSLOG	DEPUTY CHIEF OF STAFF, LOGISTICS
DCSOPS	DEPUTY CHIEF OF STAFF FOR OPERATIONS AND PLANS
DDA	DIVISION DESIGN ANALYSIS
DDAP	DIGITAL, DIAGNOSTIC, AND PROGNOSTIC
DDN	DEFENSE DATA NETWORK
DECU	DIGITAL ELECTRONIC ENGINE CONTROL UNIT
DEPMEDS	DEPLOYABLE MEDICAL SHELTER
DFAS	DEFENSE FINANCE AND ACCOUNTING SERVICE
DFBS	DEFENSE FINANCE BATTALION SYSTEM
DFD	DIRECTOR OF FORCE DEVELOPMENT
DII	DEFENSE INFORMATION INFRASTRUCTURE
DISCOM	DIVISION SUPPORT COMMAND
DISE	DISTRIBUTION ILLUMINATION SYSTEMS, ELECTRICAL
DIT	DIGITAL INTERACTIVE TRAINING
DIVARTY	DIVISION ARTILLERY

DLA	DEFENSE LOGISTICS ACTIVITY
DMLSS	DEFENSE MEDICAL LOGISTICS STANDARD SUPPORT SYSTEM
DMR	DIGITAL MEDICAL RECORD
DMSO	DIVISION MEDICAL SUPPLY OFFICE
DOD	DEPARTMENT OF DEFENSE
DOS	DAYS OF SUPPLY
DS	DIRECT SUPPORT
DSA	DIVISION SUPPORT AREA
DSC	DIGITAL SOURCE COLLECTION
DSS	DIVISION SURGEON SECTION
DT & OT I	DEVELOPMENTAL TEST & OPERATIONAL TEST I
DTLOMS	DOCTRINE, TRAINING, LEADER DEVELOPMENT, ORGANIZATION, MATERIAL, AND SOLDIER
DTTS	DEFENSE TRANSPORTATION TRACKING SYSTEM
DVE	DRIVER VISION ENHANCER
DVO	DIRECT VIEW OPTIC SYSTEMS
E	ENABLERS
E-ORC	ENABLERS-OFFSETS REQUIRED CAPABILITY
E/I	ENABLER/INITIATIVES
EAC	ECHELONS ABOVE CORPS
EAD	ECHELONS ABOVE DIVISION
ECC	EXPERIMENTAL CONTROL CELL
ECP	EQUIPMENT CHANGE PROPOSAL
ECU	ELECTRONIC ENGINE CONTROL UNIT
EEA	ESSENTIAL ELEMENT OF ANALYSIS
EMP	ELECTRO MAGNETIC PULSE
EO	ELECTRO OPTICS
EOD	EXPLOSIVE ORDNANCE DISPOSAL
EODRV	EOD RESPONSE VEHICLE
EOTF	ELECTRO-OPTIC TEST FACILITY
EOTS	ELECTRO-OPTIC TEST STATION
EPA	ENVIRONMENTAL PROTECTION AGENCY
EPLRS	ENHANCED POSITION LOCATION REPORTING SYSTEM
EPP	ELECTRICAL POWER PLANT
EQUATE	ELECTRONIC QUALITY ASSURANCE TEST EQUIPMENT
ERS	ELECTRONIC REPAIR SHELTER
ESP	EXTENDED SERVICE PROGRAM
ETM	ELECTRONIC TECHNICAL MANUAL
EW	ELECTRONIC WARFARE
EXFOR	EXPERIMENTAL FORCE
F&A	FINANCE AND ACCOUNTING
FAA	FEDERAL AVIATION ADMINISTRATION
FAADC21	FORWARD AREA AIR DEFENSE COMMAND, CONTROL, and

	INTELLIGENCE
FAMPS	FAILURE ANALYSIS AND MAINTENANCE PLANNING SYSTEM
FASTALS	FORCE ANALYSIS SIMULATION of THEATER ADMINISTRATIVE and LOGISTICAL SUPPORT
FB	FINANCE BATTALION
FBCB2	FORCE XXI BATTLE COMMAND - BRIGADE AND BELOW
FBI	FEDERAL BUREAU OF INVESTIGATION
FC	FINANCE COMMAND
FD	FUNCTIONAL DESCRIPTION
FG	FINANCE GROUP
FIN	FINANCE
FLIR	FORWARD LOOKING INFRARED SYSTEM
FLPT	FORK LIFT PALLET TRAILER
FM	FIELD MANUAL
FMS	FORCE MANNING SYSTEM
FMSA	FORCE MANAGEMENT SUPPORT AGENCY
FMTV	FAMILY OF MEDIUM TACTICAL VEHICLES
FOC	FUTURE OPERATIONAL CAPABILITY
FORSCOM	FORCES COMMAND
FP	FORCE PACKAGE
FRS	FORWARD REPAIR SYSTEM
FRS-H	FORWARD REPAIR SYSTEM - HEAVY
FSB	FORWARD SUPPORT BATTALION
FSC	FORWARD SUPPORT COMPANY
FSMC	FORWARD SUPPORT MEDICAL COMPANY
FUE	FIRST UNIT EQUIPPED
FUPP	FULL UP POWER PACK
FXXI	FORCE XXI
FY	FISCAL YEAR
GAO	GENERAL ACCOUNTING OFFICE
GCSS	GLOBAL COMBAT SUPPORT SYSTEM
GPH	GALLONS PER HOUR
GPS	GLOBAL POSITIONING SYSTEM
GS	GENERAL SUPPORT
GUI	GRAPHICAL USER INTERFACE
GVW	GROSS VEHICULAR WEIGHT
HEMTT	HEAVY EXPANDED MOBILE TACTICAL TRUCK
HEMTT-LHS	HEAVY EXPANDED MOBILE TACTICAL TRUCK- LOAD HANDLING SYSTEM
HERCULES	HEAVY EQUIPMENT RECOVERY COMBAT UTILITY LIFT AND EVACUATION SYSTEM
HET	HEAVY EQUIPMENT TRANSPORTER
HMMWV	HIGH-MOBILITY MULTI-PURPOSE WHEELED VEHICLE
HMT	HIGH MOBILITY TRAILER



HNS	HOST NATIONS SUPPORT
HQ	HEADQUARTERS
HQDA	HEADQUARTERS, DEPARTMENT OF THE ARMY
HRV	HEAVY RECOVERY VEHICLE
HVY	HEAVY
I	INITIATIVE
I/O	INPUT/OUTPUT
ICH	IMPROVED CARGO HELICOPTER
ICODES	INTEGRATED COMPUTERIZED DEPLOYMENT SYSTEM
ICS3	INTEGRATED COMBAT SERVICE SUPPORT SYSTEM
ICT	INTEGRATED CONCEPT TEAM
ID	IDENTIFICATION
IDD	INTERIM DIVISION DESIGN
IDLH	IMMEDIATE DANGER TO LIFE AND HEALTH
IECU	IMPROVED ENVIRONMENTAL CONTROL UNIT
IED	IMPROVISED EXPLOSIVE DEVICE
IEDRM	INTERACTIVE ELECTRONIC DIAGNOSTIC AND REPAIR MANUAL
IETM	INTERACTIVE ELECTRONIC TECHNICAL MANUAL
IFTE	INTEGRATED FAMILY OF TEST EQUIPMENT
ILS	INTEGRATED LOGISTICS SUPPORT
IM	INFORMATION MANAGEMENT
IMI	INFORMATION MANAGEMENT INTEGRATION
IN	INFANTRY
IOS	INTERNAL ORGANIZATION FOR STANDARDIZATION
IOT	INITIAL OPERATIONAL TEST
IOTE	INITIAL OPERATIONAL TEST AND EVALUATION
IPT	INDIRECT PRODUCTIVE TIME
IR	INFRARED
IRB	IMPROVED RIBBON BRIDGE
IRV	IMPROVED RECOVERY VEHICLE
ISCEA	INFORMATION SYSTEM COST AND ECONOMIC ANALYSIS
ISO	INFORMATION SYSTEMS OFFICER
ITAP	IMPROVED TOXICOLOGICAL AGENT PROTECTIVE
ITO/TMO	INSTALLATION TRANSPORTATION OFFICE/TRAFFIC MANAGEMENT OFFICE
ITRO	INTERSERVICE TRAINING REQUIREMENTS ORGANIZATION
ITV	INTRANSIT VISIBILITY
IVIS	INTRA-VEHICULAR INFORMATION SYSTEM
JAG	JUDGE ADVOCATE SCHOOL
JPAV	JOINT PERSONNEL ASSET VISIBILITY
JROC	JOINT REQUIRED OPERATIONAL CAPABILITY (document)
JULL	JOINT UNIFORMED LESSONS LEARNED
JV	JOINT VENTURE
Kw	KILOWATT

LADS	LAUNDRY ADVANCED SYSTEM
LAN	LOCAL AREA NETWORK
LHS	LOAD HANDLING SYSTEM
LIA	LOGISTICS IMPACT ANALYSIS
LIDD	LIGHTWEIGHT DISPOSAL DEARMER
LIN	LINE ITEM NUMBER
LME	LIGHT MAINTENANCE ENCLOSURE
LMTV	LIGHT MEDIUM TACTICAL VEHICLE
LOF	LIFE-TIME OIL FILTER
LOG	LOGISTICS
LOGCAP	LOGISTICS CIVIL AUGMENTATION PROGRAM
LOGSA	LOGISTICS SUPPORT AGENCY
LOGSITREP	LOGISTICS SITUATION REPORT
LR	LETTER REQUIREMENT
LRF/D	LASER RANGE FINDER/DESIGNATOR SYSTEM
LRU	LINE REPLACEABLE UNIT
LSE	LOGISTICS SUPPORT ELEMENT
LTC	LIEUTENANT COLONEL
LUPS	LOGISTICS UNIT PRODUCTIVITY SYSTEM
LUT&E	LIMITED USER TEST and EVALUATION
LW	LAND WARRIOR
M	MATERIEL/ (or) MODERNIZATION
M3V	MOBILE MEDICAL MONITORING VEHICLE
MAA	MISSION AREA ANALYSIS
MAC	MAINTENANCE ALLOCATION CHART
MACOM	MAJOR COMMAND
MAJ	MAJOR
MARC	MULTI-TECHNOLOGY AUTOMATED READER CARD
MARSS	MAINTENANCE AND REPAIR SUPPORT SYSTEM
MB	MEGABYTES
MC4	MEDICAL COMMUNICATION FOR COMBAT CASUALTY CARE
MCS	MANEUVER CONTROL SYSTEM
MDEP	MANAGEMENT DECISION EXECUTIVE PACKAGE
MEDCOM	MEDICAL COMMAND
MEDLOG BN	MEDICAL LOGISTICS BATTALION
MEDLOG CO	MEDICAL LOGISTICS COMPANY
MEDLOG-D	MEDICAL LOGISTICS - DIVISION
MEDSUP	MEDICAL SUPPORT
METT-T	MISSION, ENEMY, TERRAIN, TROOPS, AND TIME AVAILABLE
MG	MAJOR GENERAL
MHE	MATERIAL HANDLING EQUIPMENT
MILSTRIP	MILITARY STANDARD REQUISITIONING AND ISSUE PROCEDURES

MILTA	MICROCHIP TECHNOLOGY FOR LOGISTICS APPLICATION
MIPS	MODIFIED INTEGRATED PROGRAM SUMMARY
MITLA	MICROCHIP TECHNOLOGY FOR LOGISTICS APPLICATION
MJ	MILITARY JUDGMENT
MKT	MOBILE KITCHEN TRAILER
MMDB	MISSION MAINTENANCE DATA BASE
MMMB	MEDICAL MATERIEL MANAGEMENT BRANCH
MMP	MODERNIZATION MASTER PLAN
MNS	MISSION NEEDS STATEMENT
MOADS	MANEUVER ORIENTED AMMUNITION DISTRIBUTION SYSTEM
MOD	MODIFICATION
MOS	MILITARY OCCUPATIONAL SPECIALTY
MPI	MULTIPLE POWER INPUT
MRC	MAJOR REGIONAL CONFLICT
MRI	MEDICAL REENGINEERING INITIATIVE
MSB	MAIN SUPPORT BATTALION
MSAC	MEDICAL SITUATIONAL AWARENESS AND CONTROL
MSE	MOBILE SUBSCRIBER EQUIPMENT
MSG	MASTER SERGEANT
MSR	MAIN SUPPLY ROUTE
MSS	MUNITIONS SURVIVABILITY SOFTWARE
MST	MOBILE SUPPORT TEAM
MTBF	MEAN TIME BETWEEN FAILURE
MTS	MOVEMENT TRACKING SYSTEM
MWO	MODIFICATION WORK ORDER
N/A	NOT APPLICABLE
NBC	NUCLEAR, BIOLOGICAL and CHEMICAL
NC	NETWORK COMPUTING
NCO	NON-COMMISSIONED OFFICER
NDI	NONDEVELOPMENTAL ITEM
NEOF	NO EVIDENCE OF FAILURE
NES	NETWORK ENCRYPTION SYSTEM
NET	NEW EQUIPMENT TRAINING
NG	NATIONAL GUARD
NLT	NO LATER THAN
NTC	NATIONAL TRAINING CENTER
NVG	NIGHT VISION GOGGLES
O	ORGANIZATION
O/A	ON/ABOUT
O&O	ORGANIZATION & OPERATION
O&S	OPERATIONS AND SUPPORT
OBA	OXYGEN BREATHING APPARATUS
OBOGS	ON BOARD OXYGEN GENERATING SYSTEM

ODS	OPERATION DESERT STORM
OEC	OPERATIONAL EVACUATION COMMAND
OJE	OPERATION JOINT ENDEAVOR
OMA	OPERATIONS and MAINTENANCE, ARMY
OMS/MP	OPERATIONAL MODE SUMMARY/MISSION PROFILE
OOTW	OPERATIONS OTHER THAN WAR
OPA	OTHER PROCUREMENT, ARMY
OPTEC	OPERATIONAL PLANNING, TEST, AND EVALUATION COMMAND
OPTEMPO	OPERATIONAL (OPERATING) TEMPO
OR	OPERATIONAL READINESS
ORD	OPERATIONAL REQUIREMENTS DOCUMENT
OST	ORDER SHIP TIME
OT	OPERATIONAL TEST
PACMED	PACIFIC MEDICAL
PACOM	PACIFIC COMMAND
PAM	PAMPHLET
PC	PORTABLE COMPUTER
PDA	PERSONAL DATA (OR DIGITAL) ASSISTANT
PE	PROGRAM ELEMENT
PERSITREP	PERSONNEL SITUATION REPORT
PIN	PERSONAL IDENTIFICATION NUMBER
PLS	PALLETIZED LOAD SYSTEM
PM	PROJECT MANAGER
PMCS	PREVENTIVE MAINTENANCE CHECKS and SERVICES
PM-MEP	PROGRAM MANAGER FOR MOBILE ELECTRIC POWER
PM-TMDE	PROGRAM MANAGER-TEST MEASUREMENT AND DIAGNOSTIC EQUIPMENT
PMA	PERSONAL MAINTENANCE AID
POI	PROGRAM OF INSTRUCTION
POL	PETROLEUM
POM	PROGRAM OBJECTIVE MEMORANDUM
POSNAV	POSITIVE NAVIGATION
PQAS	PETROLEUM QUALITY ANALYSIS SYSTEM
PSS	PERSONNEL SERVICE SUPPORT
PSSCS	PERSONNEL SERVICES SUPPORT CONTROL SYSTEM
PSY	PERSONNEL STAFF YEAR
PUMA	POCKET UNIT MAINTENANCE AID
QM	QUATERMASTER
QTR	QUARTER
R&D	RESEARCH & DEVELOPMENT
RAF	RADIO FREQUENCY
RAM	RELIABILITY, AVAILABILITY, AND MAINTAINABILITY
RAP	REMEDIAL ACTION PROGRAM
RC	RESERVE COMPONENT

RCT	REMOTE CONTROLLED TRANSPORTER
RDT&E	RESEARCH, DEVELOPMENT, TEST & EVALUATION
RECORM	REMOTE CONTROLLED RECONNAISSANCE MONITOR
RF	RADIO FREQUENCY
RM	RESOURCE MANAGEMENT
RML	REVOLUTION IN MILITARY LOGISTICS
ROC	REQUIRED OPERATIONAL CAPABILITY
ROM	READ ONLY MEMORY
RONs	REMOTE ORDNANCE NEUTRALIZER SYSTEM
ROWPU	REVERSE OSMOSIS WATER PURIFICATION UNIT
RPM	REVOLUTIONS PER MINUTE
RTCC	ROUGH TERRAIN CONTAINER CRANE
RTCH	ROUGH TERRAIN CONTAINER HANDLER
SA	SITUATIONAL AWARENESS
SAAS	STANDARD ARMY AMMUNITION SYSTEM
SACIMS	SENSOR ARTIFICIAL INTELLIGENCE (AI) COMMUNICATIONS INTERACTIVE MAINTENANCE SYSTEM
SAMS	STANDARD ARMY MAINTENANCE SYSTEM
SARSS	STANDARD ARMY RETAIL SUPPLY SYSTEM
SASO	STABILITY AND SUPPORT OPERATIONS
SC	SUPPLY CIRCULAR
SFC	SERGEANT FIRST CLASS
SICPS	STANDARD INTEGRATED COMMAND POST SHELTER
SIDPERS	STANDARD INSTALLATION/DIVISION PERSONNEL SYSTEM
SIMEX	SIMULATION EXERCISE
SINCGARS	SINGLE CHANNEL GROUND-AIR RADIO SYSTEM
SLA	STRATEGIC LOGISTICS AGENCY
SLOT	SELF-LOADING/OFFLOADING TRAILER
SME	SUBJECT MATTER EXPERT
SME-MJ	SUBJECT MATTER EXPERT – MILITARY JUDGMENT
SN-ICE	STATEMENT OF NEED-INDIVIDUAL CLOTHING AND EQUIPMENT
SOP	STANDARD OPERATING PROCEDURE
SPO	SECURITY, PLANS, AND OPERATIONS
SPORT	SOLDIER'S PORTABLE ON-SYSTEM REPAIR TOOL
SPSR	SUPPLY POINT STATUS REPORT
SRA	SYSTEM RESEARCH AND ANALYSIS
SRU	SHOP REPLACEABLE UNIT
SSA	SUPPLY SUPPORT ACTIVITY
SSI	SOLDIER SUPPORT INSTITUTE
STAMIS	STANDARD ARMY MANAGEMENT INFORMATION SYSTEM
STAR	SYSTEM THREAT ASSESSMENT REPORT
STE	SIMPLIFIED TEST EQUIPMENT
STE-ICE	SIMPLIFIED TEST EQUIPMENT-INTERNAL COMBUSTION ENGINE

STEPO	SELF-CONTAINED TOXIC ENVIRONMENT PROTECTIVE OUTFIT
STON	SHORT TON
SWA	SOUTHWEST ASIA
T-MED	TELEMEDICINE
TAA	TACTICAL ASSEMBLY AREA/ (or) TOTAL ARMY ANALYSIS
TAMMIS	THEATER ARMY MEDICAL MANAGEMENT INFORMATION SYSTEM
TAP	TOXICOLOGICAL AGENT PROTECTIVE
TAPDB	TOTAL ARMY PERSONNEL DATA BASE
TAV	TOTAL ASSET VISIBILITY
TB	TECHNICAL BULLETIN
TBD	TO BE DETERMINED
TC AIMS	TRANSPORTATION COORDINATOR'S AUTOMATED INFORMATION FOR MOVEMENTS SYSTEM
TCACCIS	TRANSPORTATION COORDINATOR COMMAND AND CONTROL INFORMATION SYSTEM
TDA	TABLE OF DISTRIBUTION AND ALLOWANCES
TDP	TOTAL DISTRIBUTION PROGRAM
TECOM	TEST AND EVALUATION COMMAND
TED	TURBINE ENGINE DIAGNOSTICS
TEMOD	TEST EQUIPMENT MODERNIZATION
TEP	TACTICAL ELECTRIC POWER
TEXCOM	TEST AND EXPERIMENTATION COMMAND
TF	TASK FORCE
TFXXI	TASK FORCE XXI
TI	TACTICAL INTERNET
TIGER	TACTICAL INTERACTIVE GROUND EQUIPMENT REPAIR
TM	TECHNICAL MANUAL
TMDE	TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT
TMIP	THEATER MEDICAL INFORMATION PROGRAM
TMT	TRANSPORTATION MOTOR TRANSPORT
TOA	TOTAL OBLIGATION AUTHORITY
TOE	TABLE OF ORGANIZATION AND EQUIPMENT
TPN	TACTICAL PACKET NETWORK
TPS	TEST PROGRAM SET
TQG	TACTICAL QUIET GENERATOR
TRAC	TRADOC ANALYSIS CENTER
TRAC-LEE	TRADOC ANALYSIS CENTER- FORT LEE
TRAC-SAC	TRADOC ANALYSIS CENTER-STUDY AND ANALYSIS CENTER
TRADOC	(UNITED STATES ARMY) TRAINING AND DOCTRINE COMMAND
TRANSCOM	TRANSPORTATION COMMAND
TRAPR	TRANSPORTATION RESEARCH ACCOUNTING AND PHONE

	REPORTING
TRASR	TRANSPORTATION RESEARCH ACCOUNTING AND SATELLITE REPORTING
TRI-TAC	TRI-SERVICE TACTICAL COMMUNICATION SYSTEM
TSA	THEATER STORAGE AREA
TSM	TRADOC SYSTEM MANAGER
TTP	TACTICS, TECHNIQUES, AND PROCEDURES
TVAR	TASK VEHICLE AVAILABILITY RATE
TWV	TACTICAL WHEELED VEHICLE
UDR	UNIVERSAL DATA RECOVERY
UFD	USER FUNCTIONAL DESCRIPTION
UFR	UNFUNDED REQUIREMENT
UIC	UNIT IDENTIFICATION CODE
ULLS	UNIT LEVEL LOGISTICS SYSTEM
UM	UNIT MAINTENANCE
UMC	UNIT MOVEMENT COORDINATOR
UMO	UNIT MOVEMENT OFFICER
UMT	UNIT MINISTRY TEAM
USAARC&S	UNITED STATES ARMY ARMOR CENTER & SCHOOL
USAAVNC&S	UNITED STATES ARMY AVIATION CENTER & SCHOOL
USAF	UNITED STATES AIR FORCE
USAOC&S	UNITED STATES ARMY ORDNANCE CENTER & SCHOOL
USAOMMC&S	UNITED STATES ARMY ORDNANCE MISSILE MUNITIONS CENTER & SCHOOL
USAPPC	UNITED STATES ARMY PUBLICATION AND PRINTING COMMAND
USAR	UNITED STATES ARMY RESERVE
USATA	UNITED STATES ARMY TEST, MANAGEMENT, AND DIAGNOSTIC EQUIPMENT ACTIVITY
USMC	UNITED STATES MARINE CORPS
UUT	UNIT-UNDER-TEST
UXO	UNEXPLODED ORDNANCE
VCSA	VICE CHIEF OF STAFF, ARMY
VIC	VECTOR-IN-COMMANDER
VIMEPS	VEHICLE INTEGRATED MULTIPLE POWER SOURCE
VM	VELOCITY MANAGEMENT
VMF	VARIABLE MESSAGE FORMAT
WFLA	WARFIGHTING LENS ANALYSIS
WIN	WARFIGHTING INFORMATION NETWORK
WO	WARRANT OFFICER
WPSM	WARFIGHTER PHYSIOLOGICAL STATUS MONITOR
WRAP	WARFIGHTER RAPID ACQUISITION PROGRAM
WWW	WORLDWIDE WEB
ZLIN	ZULU LINE ITEM NUMBER

